

AMIGA

ART *expression*

The Amiga Illustration Program

Lessons Manual

For Amiga Personal Computers

ART *expression*

Lessons Manual
First Edition

Soft-Logik Publishing Corporation
We give you the tools to dream.

ART EXPRESSION LESSONS MANUAL: FIRST EDITION: OCTOBER 1992

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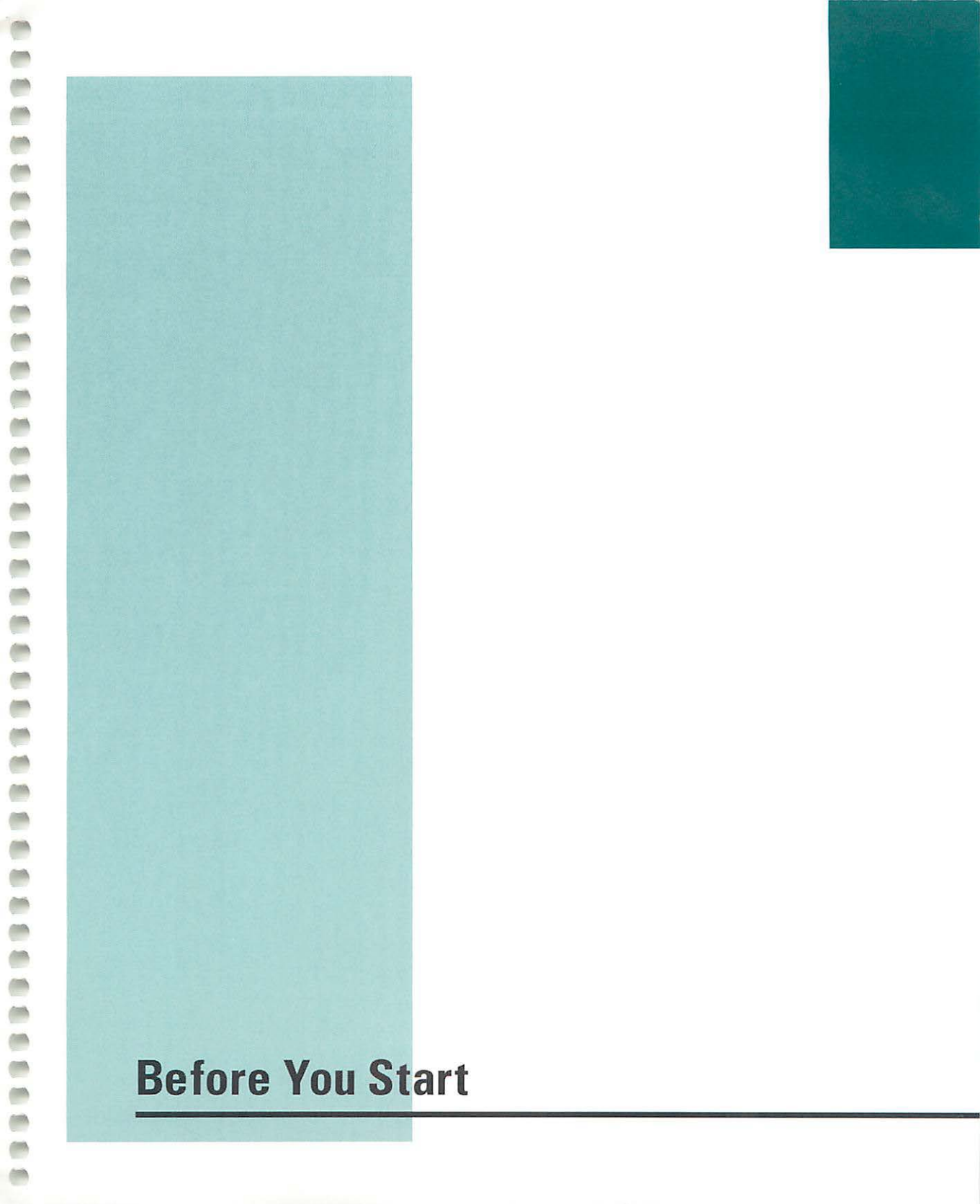
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Before You Start



Before You Start...

Learning Art Expression

Art Expression is an easy program to learn. It follows Amiga user interface style guidelines so that its menu organization and requester gadgets should be simple to use without opening a manual. It also shares a number of features with other popular software, such as PageStream, so that users of those programs can use some tools and features immediately.

Art Expression is the first real illustration program for the Amiga. It makes an important distinction between objects and paths, something done by no other Amiga drawing program. While you can jump in and use the program without reading the manual, you will be unaware of why Art Expression works the way it does, and will be unable to take full advantage of all its features. You may even consider some of the options to be problems with Art Expression, when in fact they are significant features.

Tutorial Organization

The *User Manual* is an important reference tool. Keep it beside you as you use Art Expression so that you can look up features whenever you have a problem. This manual, the *Lessons Manual*, is designed to help you learn Art Expression. It is organized into three lessons covering most of Art Expression's features. You can follow these lessons at your own pace or start anywhere that interests you. You do not have to finish the tutorial projects if you believe that you have learned their goals. Use the skill lists at the start of each tutorial to decide what to do.

Art Expression

Lesson One, *Learning the Basics*, shows you how to use the illustration window and use the basic shape tools. The lesson goal is to create a bar graph chart. The features used in this tutorial are fundamental to using Art Expression. You should be able to create your own simple illustrations after following this tutorial.

Lesson Two, *An Illustration Project*, demonstrates how to use some of Art Expression's more advanced drawing and editing tools. You will learn how to create text objects and how to bind text to a curved path. You should be able to create more complex illustrations after following this tutorial.

Lesson Three, *Techniques and Tracing*, shows you how to convert bitmap pictures into structured drawings with BME, and how to place these into Art Expression. You will also learn how to edit paths, and how to add and delete path points. After completing this tutorial, you should be able to create any type of illustration with Art Expression.

At the end of the three tutorials is a short cookbook. This section demonstrates completed projects and provides brief steps to create them. If you have completed the other tutorials you should be able to understand how these projects were done and then be able to use the techniques in your own designs.

Important!

You must install Art Expression on your Amiga before you begin these tutorials. Refer to page xii of the *User Manual* for installation instructions.

Art Expression uses the standard Amiga Intuition interface. You should be familiar with using your Amiga before you attempt to follow the tutorials. The skills you should have before starting are:

- using a window;
- using requester gadgets; and
- using the mouse—clicking, selecting, dragging, choosing menu commands.



For more information on the *Defaults* command, refer to page xv of the *User Manual*.

You will be instructed to print your work in each lesson. Ensure that your printer is on and connected before starting. If you do not have a PostScript printer, ensure that you have selected the correct *Preferences* driver and that *Preferences* is selected in the *Defaults* requester.

If you have less than 1MB of chip RAM in your computer, you may be unable to print your files successfully to a *Preferences* printer.

Screen Mode

You can complete the tutorials in any screen resolution. The screen pictures in this manual demonstrate the tutorials in 640x400 mode.



1

Learning the Basics



Lesson 1:

Learning the Basics

Lesson Goals

This first tutorial is designed to introduce you to Art Expression's basic concepts. You will learn to navigate the Art Expression screen and to draw simple illustrations.

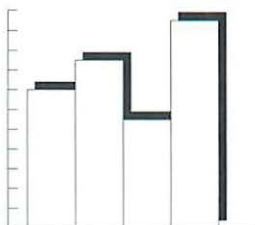
In this lesson you will learn how to:

- Start Art Expression;
- Use the illustration window;
- View an illustration;
- Draw a basic shape;
- Select an object;
- Move an object;
- Delete an object;
- Clone an object;
- Resize an object;
- Set the grid;
- Make multiple copies of an object;
- Change the fill style of an object;
- Change the depth of an object;
- Save and name your illustration;
- Print your illustration; and
- Exit Art Expression.

Lesson One

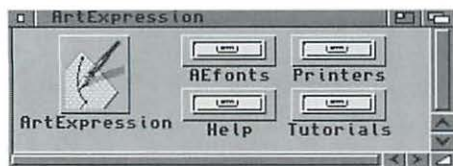
The Task: Drawing a Bar Graph

For this first lesson, you will draw a bar graph. Bar graphs are used to show relative data on two axes. Bar graphs are common in business and provide an easy way to learn Art Expression's basic features.



Getting Started

To start Art Expression, find the Art Expression drawer on your Workbench. Art Expression is started in the same way as other Amiga programs, by double clicking on the program icon. You can also start Art Expression from a shell by setting the stack to 20000 prior to loading Art Expression.



The Art Expression drawer will open.



Setting Preferences for this Lesson

Before you continue you must set your Art Expression preferences to complete this tutorial successfully. Choose the following menu commands and select the appropriate options in each requester:

Settings/Drawing Units...

Inches (This tutorial is designed for inches but can easily be completed using centimeters or other drawing units.)

Settings/Drawing Prefs...

Draw Circle/Ellipse from Center = Off

Prompting = On

DoubleClick On = Off

Spring-Load Tools = Off

Spring-Load Text = On

Undo Available = On

Settings/Coordinates = toggle on

Settings/Rulers = toggle on

Settings/Show Grid = toggle on

Settings/Grid Snap = toggle on

Settings/Set Grid...

x: 0.25 inches y: 0.25 inches

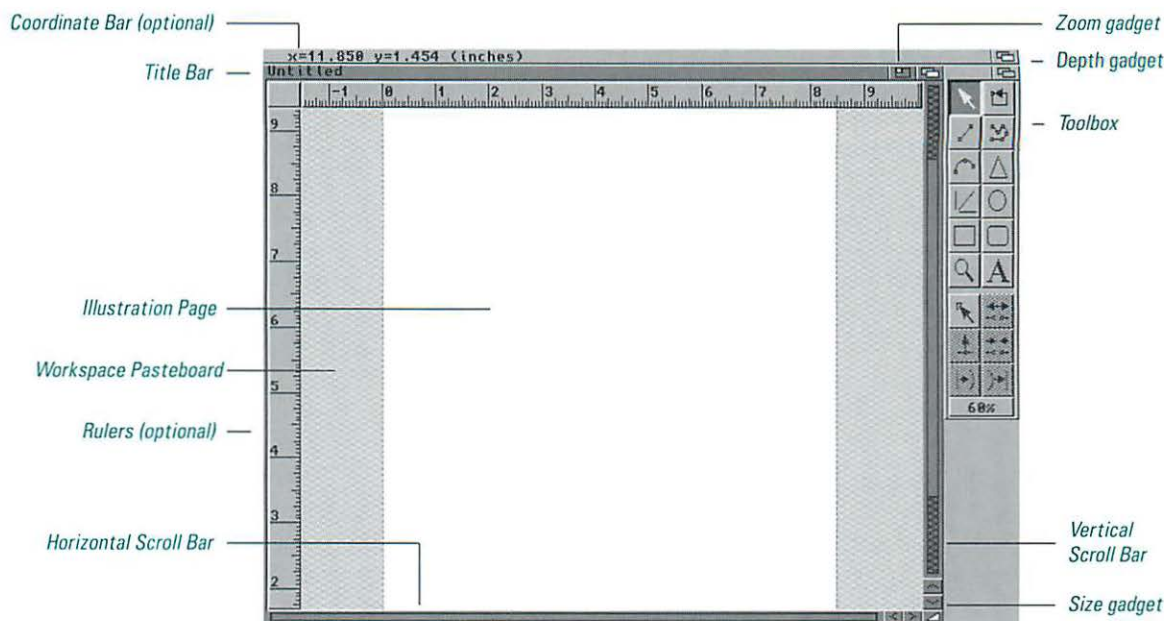
Settings/Show Guides = toggle off

Settings/Guides Snap = toggle off

Lesson One

The Illustration Window

After Art Expression loads, the Art Expression screen will appear. Familiarize yourself with the various parts of the screen. Art Expression uses a standard Workbench interface so it should be immediately familiar to you if you have used other Amiga applications.



For more information on the Art Expression screen, refer to page 1.3 of the *User Manual*.

An illustration window will be opened automatically when you start Art Expression. You can load an existing illustration into this window or draw a new illustration in it.

The window gadgets allow you to move and resize the illustration window. You can use the scroll bars to view different parts of the illustration.

The Mouse Pointer

The mouse pointer is the primary method for interacting with the Art Expression interface. It allows you to select menu commands, to choose tools from the toolbox, to draw objects in the illustration window and to change existing objects.



The mouse pointer can take on several mouseforms depending on the selected mode. The basic mouseform is called the pointer because of its arrow shape. The pointer is used to select objects and to use the Art Expression interface. The mouseform will change to a pointer whenever the mouse is outside of the illustration window or when the *Object* or *Edit Points* tools are selected.



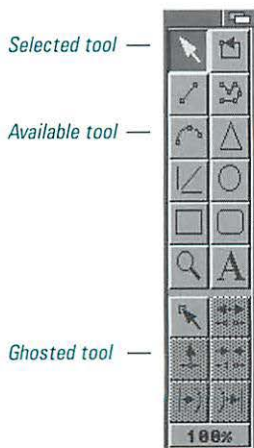
The second important mouseform is the crosshair. The mouseform will change to a crosshair whenever a drawing tool is selected. The crosshair is used to draw shapes and paths in the illustration window.

Other mouseforms are used for changing view magnifications and for rotating, skewing and moving objects.

The Toolbox

The toolbox is the heart of the Art Expression's interface. It is used to select the type of object to draw and to change existing objects. To use the toolbox, position the mouse pointer over any available tool and click on it with the left mouse button. Tools which are ghosted out are unavailable in the current program mode.

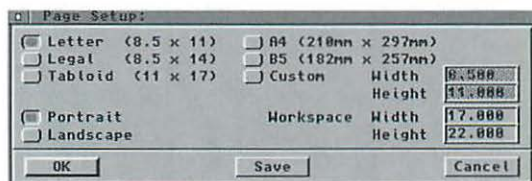
The selected tool will be depressed in the toolbox. Some tools do not remain depressed when they are chosen because they perform an action and return to the *Object* or *Edit Points* tool after completion, or because the *Spring-Loaded Tools* option is selected in the *Drawing Prefs...* requester.



The Illustration Workspace

Changing the Page Size

Art Expression will default to a letter-sized page (8.5 x 11 inches). You can change the size of the current illustration or the default size with the *Page Setup...* command from the *Project* menu. Select this command now to open the *Page Setup* requester.



If it is not already set, change the page size to letter and the orientation to portrait. This will make the page 8.5 inches across and 11 inches down. Change the workspace size to something larger than the page size. 17 x 22 inches is a good value. When you are done click on *OK* to accept the changes to the current illustration. If you want to make the new size your default, click on the *Save* gadget.

Changing View Magnifications

You can view your illustration at actual size (100%) or at any size from 25 to 3200%. This allows you to zoom out and see the illustration as a whole or to zoom in to work on a specific section of it.

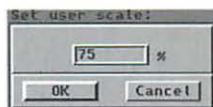


Art Expression will default to *Actual Size* unless you have previously changed the default view. Choose the *Full Page* command from the *View* menu. Note that the illustration page has a white background while the workspace pasteboard has a gray background. You will draw your illustration on the page and use the workspace pasteboard for storing objects or drawing objects before placing them in the illustration.

Choose the *Full Workspace* command. This will show the entire workspace and allow you to find objects you may have placed off the page. Note that the rulers change to reflect the current view magnification.

The view magnification level can be seen at the bottom of the toolbox. Clicking on this part of the toolbox will open the *User Scale* requester and is identical to choosing the *User Scale...* command from the *View* menu. Click on the *User Scale* tool now.

100%



Type “250” into the text gadget in the *User Scale* requester and then click on *OK*. This will zoom in to two and a half times of actual size. The *User Scale* command is useful because it allows you to set the exact view magnification.



The *Magnifier* tool is an alternate way to zoom in on an area but it does not give you as much control over the magnification level. It does allow you to choose the area to magnify which can be very useful. Choose the *Magnifier* tool from the toolbox now. The mouseform will change to a magnifying glass when it is inside the illustration window.



Position the magnifying glass pointer over an area of the illustration window to enlarge. Click the left mouse button and Art Expression will redraw the window at double the previous size. (Unless you have previously changed the magnification increment in the *Drawing Prefs* requester.)



The *Magnifier* tool can also be used to zoom out from an area. Hold down a *Shift* key. The plus sign in the middle of the magnifying glass pointer will change to a minus sign. This indicates that it will reduce the view mode. While holding down *Shift*, click on the illustration window and Art Expression will halve the magnification.

When you are done, return to 100% view. You can select the *Actual Size* command from the *View* menu to change to it quickly. Choose the *Object* tool from the toolbox to return to the standard mouse pointer.

Using the Rulers



For more information on changing measurement systems, refer to page I.11 of the *User Manual*.

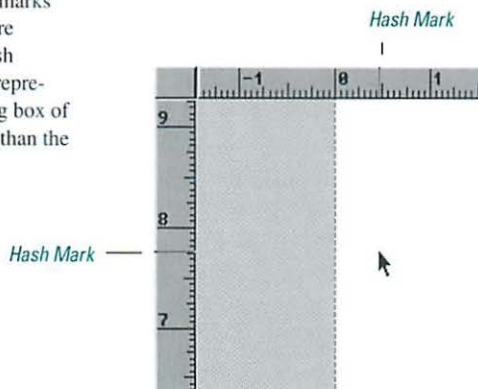
Art Expression provides rulers along the top and left sides of the illustration window to aid you in drawing, moving and sizing objects. The rulers show the position of the mouse pointer in the measurement system of your choice. You can turn the display of rulers on or off at any time with the *Rulers* command from the *Settings* menu.

Lesson One

If you have correctly setup Art Expression for this tutorial, the rulers will already be toggled on. Toggle them off by selecting the *Rulers* command. Note that this gives you more working space but sacrifices the convenience of knowing how much of the page is visible. Toggle the rulers back on again.

i Note that the rulers will show two sets of hash marks when object(s) are selected. The hash marks will then represent the bounding box of the object rather than the mouse position.

Move the mouse about the workspace. Note that hash marks on the ruler move as you move the mouse pointer. These show its current position.



The ruler origin is at the bottom left corner of the illustration page. The ruler values increase from left to right and from bottom to top. This is the standard measurement metaphor for professional illustration and CAD programs. Desktop publishing programs normally have their ruler origins in the top left corner so it may take some getting used to Art Expression's rulers if you have not used a professional illustrator previously.

Using the Coordinate Bar

The *Coordinate Bar* is positioned at the top of the screen when toggled on. It is a separate window which can be moved. It is most useful when placed at the top of the screen covering the screen's title bar. This takes advantage of unused screen space without covering the screen's depth gadget(s).

`l=-2.250 b=-0.184 r=11.663 t=10.750 w=13.913 h=10.934 (inches)`

The *Coordinate Bar* provides exact information for the position of the mouse pointer. It also provides information about the position of objects and changes made to them. When you move the mouse pointer in the illustration window the *Coordinate Bar* will display the current mouse coordinates. As you change an object you will see its dimensions change in the bar.

Drawing Basic Shapes

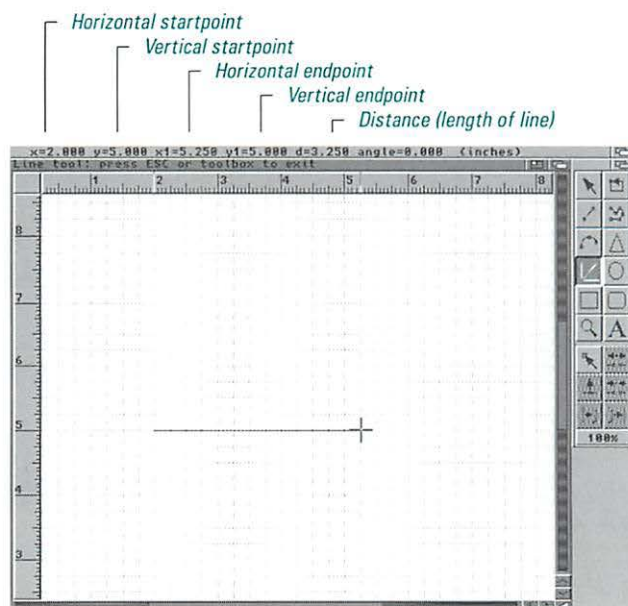
Drawing Lines



Choose the *Line* tool from the toolbox. The mouseform will change to a crosshair mouseform inside the illustration window.

Position the mouse at x:2, y:5, approximately. Note that the horizontal axis is referred to as the “x” axis and the vertical axis the “y” axis. Use the *Coordinate Bar* to position the mouse accurately. The coordinates do not need to be exactly at 2, 5 inches because the *Grid Snap* feature will snap the line you will draw to 2, 5". (You may not be viewing this area of the illustration because you used the magnification tools earlier. Use the scroll bars to make this portion of the window visible.)

Press and hold down the left mouse button. This will start the line. Drag the mouse to the right until the coordinates are approximately x:2, y:5, x1: 5.25, y1:5, d:3.25. The “x1” and “y1” coordinates are for the end point of the line. The “d” coordinate is the distance you have moved the mouse. There is also an angle coordinate. This should be 0° because you are drawing a horizontal line.



Lesson One

After you have the crosshair positioned at the end point, release the mouse button. The line will be ended and will have a size handle at each end. This indicates that it is the selected object.

In summary, the steps to draw a line are:



1. Select the Line tool.

The pointer will change to a drawing crosshair.

2. Position the mouse crosshair. Drag the mouse to draw the line.

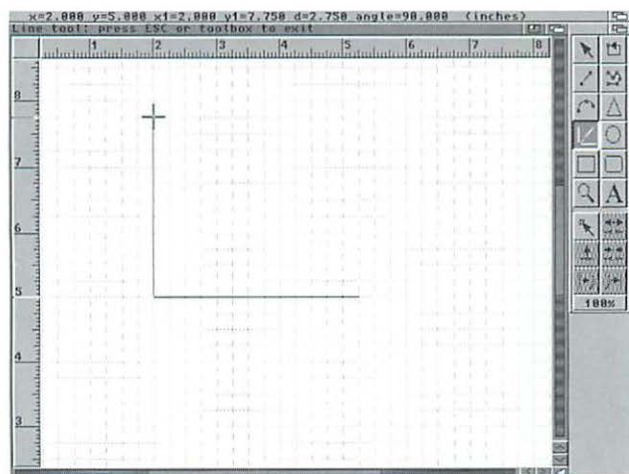
Hold down the left mouse button and drag the mouse. The line will be drawn from the point at which you start dragging the mouse.

3. Release the mouse button.

The line will be created after you release the mouse button.

If you make a mistake and click at the start point instead of dragging the mouse, no object will be drawn. If you draw an incorrect line, you can move it by dragging it, or resize it by dragging a size handle.

The line you have drawn will be the baseline for our bar graph. Now you need to draw a vertical line. Start at the same start point and draw a line to x:2, y:7.75.



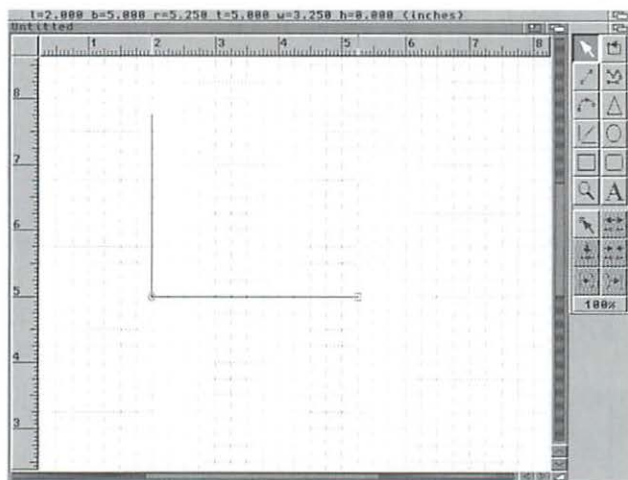
Note how easy it is to draw lines of an exact distance with the *Grid Snap* feature. It only allows you to draw objects which are a multiple of the grid spacing set with the *Set Grid...* command. The grid spacing for this tutorial is 0.25 inches.

Selecting Objects



Before we go any further you must learn how to select objects. Switch to the *Object* tool. This will change the mouseform to a pointer. The last object drawn will be selected. Click on the first line with the mouse pointer. The size handles from the currently selected line will disappear and the first line will be selected. Size handles are used to resize the object and show the boundaries of the object.

Unselected line



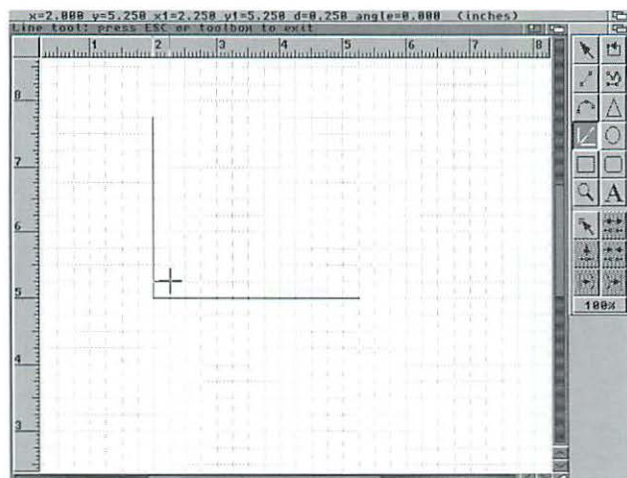
One end of the line will have an “X” symbol. This is the rotation point of the line. The rotation point is the point around which the object can be rotated, skewed or transformed. It can be changed at any time with the *Set Rotation Point* command.

Now click on the other line. The size handles from the first line will disappear and handles will appear at the end of the second line. It is now the selected object. Selecting objects is one of the most fundamental skills required to use Art Expression.

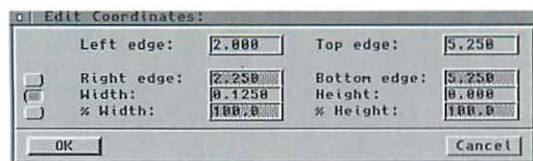
Lesson One

Editing Coordinates

Now you need to draw the tick marks on the vertical line. Check the finished drawing on page 4. The bottom tick mark is 0.25" up from the bottom line of the graph and is 0.125" wide. Since the grid is set to 0.25" spacing you can only draw 0.25" lines. Draw a 0.25" tick mark now.



To make the tick mark narrower, switch to the *Object* tool. This will change the mouseform to a pointer. The last object drawn (the tick mark) will be selected. Choose the *Edit Coordinates...* command from the *Object* menu. This will open a requester to change the coordinates of the selected object.

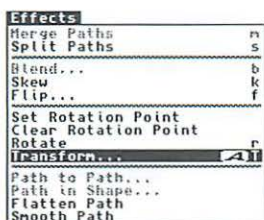


The coordinates of the tick mark line will be shown. Click on the radio button gadget for *Width* and *Height*. This will unghost the *Width* and *Height* text gadgets. Change the width from 0.25 to 0.125 inches.

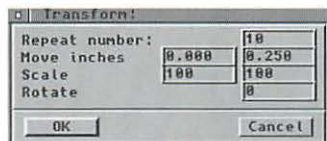
When you are done, click on the *OK* gadget. The line will be resized.

Duplicating Objects

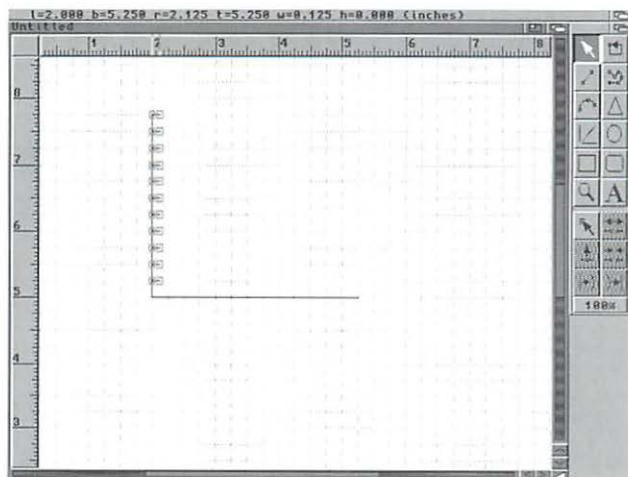
Now you are ready to create the other tick marks. There are 11 tick marks in the completed graph so we need 10 more. The first tick mark should still be selected. If you have deselected it, reselect it at this time.



Choose the *Transform...* command from the *Effects* menu. This opens a requester to make multiple copies of an object with specified offsets.



Enter “10” into the *Repeat Number* text gadget to make ten copies. Press *Return* twice to move to the vertical *Move* text gadget. We don’t want the objects moved horizontally so we will leave the horizontal *Move* text gadget equal to zero. Change the vertical *Move* text gadget to 0.25”. These settings will duplicate the tick mark 10 times, with each successive copy 0.25” higher than the last.



When you click on the *OK* gadget, Art Expression will make the requested copies. All of the copies will be automatically selected in case you need to modify them with another command. To deselect all the objects, press the *Space Bar*.

Lesson One

Setting the Grid

Now that the axes for the graph are drawn, you can draw the bars. The first bar is 0.625 x 1.75". The width is once again not a multiple of the grid spacing. You could draw the box and then change its width with the *Edit Coordinates...* command, but it is easier to change the grid sometimes.



Choose the *Set Grid...* command from the *Settings* menu. This opens a requester to change the grid spacing. Change the *x*: and *y*: values to 0.125.

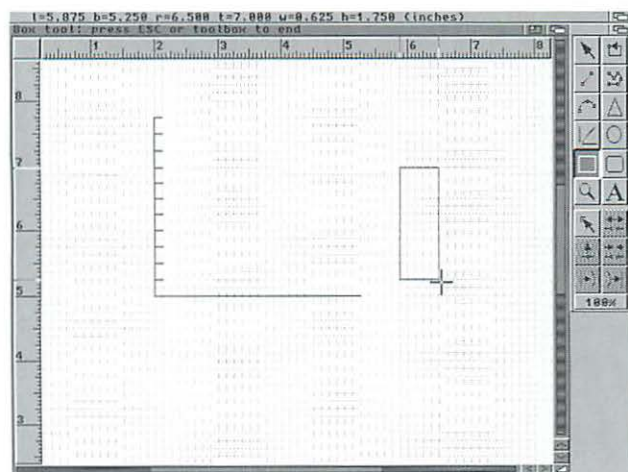


Click on the *OK* gadget to close the requester. The screen will be redrawn with an eighth of an inch grid spacing.

Drawing Boxes



Choose the *Box* tool from the toolbox. Move the mouse to a clear area of the illustration window and draw a box 0.625" wide and 1.75" tall. To draw the box, press and hold down the left mouse button. This will start the box. Drag the mouse to the right until the coordinates in the *Coordinate Bar* are the correct size. Release the mouse button to end the box.



In summary, the steps to draw a box are:



1. Select the Box tool.

The pointer will change to a drawing crosshair.

2. Position the mouse crosshair. Drag the mouse to draw the box.

Hold down the left mouse button and drag the mouse. The box will be drawn from the point at which you start dragging the mouse.

3. Release the mouse button.

The box will be created after you release the mouse button.



You do not need to draw down to the right as shown here. You can start from any corner of a shape and draw in any direction.



*Select a
shape tool.*



*Position the
crosshair.*



*Drag the mouse
diagonally.*



*Release the mouse
button.*

Moving Objects

Now that the box has been drawn you can move it into position. You could have drawn the box in its final position but it is often easier to draw objects out of the clutter of the main illustration and then move them into position.



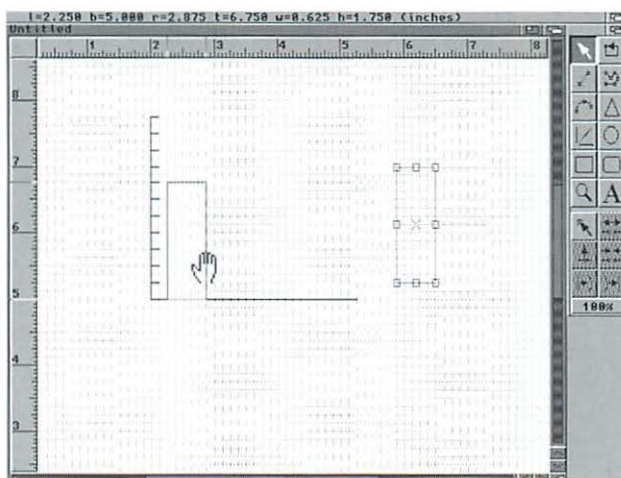
Choose the *Object* tool. The box will be automatically selected since it was the last object drawn. Place the mouse pointer over one of its lines. You cannot select or move an object from its center unless it is filled. If it is unfilled you can only select or move it by using its strokes.



Press and hold down the left mouse button. If you have correctly positioned the mouse pointer over the box, the mouseform will change from an arrow pointer to an open hand. This will indicate that you can move the box.

Drag the box by moving the mouse. Note that while you are dragging the box you will still see a shadow of the box at its original position. When the box is positioned at $l=2.250$ (left), $b=5.000$ (bottom), release the mouse button. Art Expression will redraw the box at its new position and the mouseform will change back to an arrow pointer.

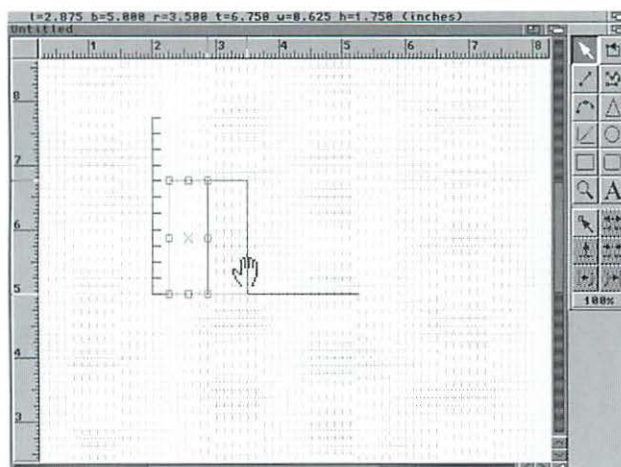
Lesson One



Cloning Objects

You are now ready to make the three other bars. The easiest way is to copy the original box and clone it to fit.

Place the mouse pointer over one of the lines of the box. Hold down the *Ctrl* and *Alt* keys simultaneously. Press and hold the left mouse button. The mouseform will change to an open hand. Drag the box until its left edge is even with the right edge of its former position. Release the mouse button. The box will not be moved, but a new copy will be made at the new position.



Repeat this technique for the other two bars. When you are done you should have four boxes side-by-side, each the same height.

In summary, the steps to move an object by dragging are:

1. Select the object to move.



Select the object to move with the *Object* tool. You can select multiple objects by holding down *Shift*. The selected objects will move together.

2. Position the mouse pointer over the object to move.

Do not position the mouse pointer over a size handle or you will resize the object. For an unfilled object, point on a line or curve segment.

3. Drag the object to another position.

Press the left mouse button and drag the object to another area on screen. You may want to change view magnifications or scroll the screen so that you can see both the original position and the new position at the same time.



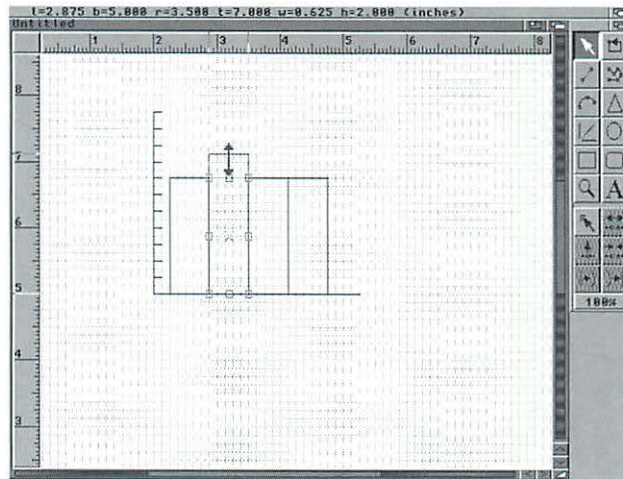
Another way to make the copies of the first box is to choose the *Duplicate* command from the *Object* menu. This makes a single copy slightly offset down and to the right of the original. You can then move the copy into the desired position. While this method takes an extra step compared to the drag/copy method, it is easier for left-handed users.

Resizing Objects

Now you can resize the boxes to match the illustration on page 4. The second box is 2.125" high, the third is 1.375" and the fourth is 2.625". To resize an object, drag one of its size handles to a new position.

You can choose any of the top size handles to make the second box taller, but the middle one is best because it only allows you to resize the box vertically. This prevents you from accidentally resizing the box horizontally. Move the middle size handle up three grid units (0.375") by holding down the left mouse button and dragging it. Release the mouse button to redraw the box at its new size.

Lesson One



Repeat this technique to resize the other boxes to match the finished bar graph on page 4.

In summary, the steps to resize an object by dragging a size handle are:



1. Select the object to resize.

Select the object to move with the *Object* tool. You can select multiple objects by holding down *Shift*. The selected objects will resize together.

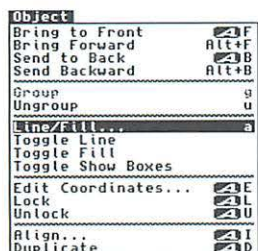
2. Position the mouse pointer over a size handle and drag.

Position the pointer over a size handle, hold down the left mouse button, and drag in any direction. Release the mouse button to redraw the object at its new size.

Changing Object Attributes

Filling Objects

Now you are ready to fill the bars in the graph. If you have a color printer you can choose different colors for each bar. If you have a black and white printer you should choose different percentage fills.



Select the left box with the mouse pointer. Choose the *Line/Fill...* command from the *Object* menu. This opens a requester to change the line, fill, end style and color of objects.



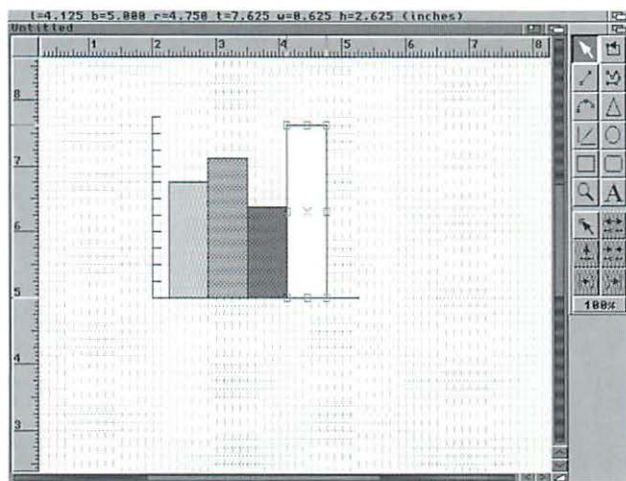
If you have a black and white printer, click on the percentage fill radio button gadget to unghost its text gadget. Change the text gadget to "20" to change the fill from solid (100%) to a lighter gray. Press the *Return* key once to see the change in the object sample in the upper-right corner of the requester.

If you have a color printer, select any color from the *Fill* color scrolling list by clicking on it with the mouse pointer.

When you have made your choices, click on the *OK* gadget to close the requester. The box will be redrawn with the new fill style.

Repeat this technique for the other three boxes. Change the second box to 40% and the third to 60%. Make the fourth bar solid white. Choose *White* from the *Fill* color selector and leave its fill style as solid. (If you do not make it solid white, the black shadow you will make in the next step will show through its transparent fill.)

Lesson One



In summary, the steps to change the attributes of object(s) are:

1. Select the object(s) to change.



Select the object(s) to change with the *Object* tool. You can select multiple objects by holding down *Shift*.

2. Choose the *Line/Fill...* command from the *Object* menu.

The *Line/Fill* requester will open.

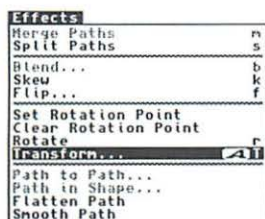
3. Change the attributes.

Change any of the attributes by clicking on the appropriate gadgets. Only the attributes changed will be reset when you click on *OK*, so if any of the objects' attributes conflict, those which are unchanged will not be overwritten. Click on *OK* when done.

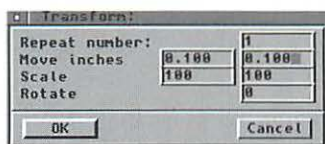
Extended Selection

Only one step remains to finish the bar graph. The finished example on page 4 has black shadows offset 0.1" from the bars. Each shadow can be created individually, but it is much easier to make them all at the same time.

First you must select all the bars at once. Select one of the boxes with the mouse pointer. Then hold down a *Shift* key and select another box. This will select that box while keeping the other box selected. This technique is known as *extended selection*. *Shift* click on the other two boxes so that all four are selected simultaneously.



Choose the *Transform...* command from the *Effects* menu. Enter a “1” into the *Repeat Number* gadget and set the *Move* offsets to x:0.1 and y:0.1. Ensure that the *Scale* gadgets are set to 100% and the *Rotate* gadget is set to 0°. Click on the *OK* gadget to make the copies.



Deselecting Objects

The new bars will be the same color and fill as the original bars and will be stacked in front of them. Both the original and new bars will be selected. You want to select only the new bars, so click anywhere in the illustration window to deselect all the selected objects. Often the screen is cluttered and there is not any free space to click on, so you can press the *Space Bar* to deselect all selected objects.



Now you can reselect the new bars. Click on one of them to select it and then *Shift* click on the other three. To make the new bars black, choose the *Line/Fill...* command from the *Object* menu. Change the fill to solid black by clicking on the *Solid* radio button gadget and on *Black* from the *Fill* color scrolling list. Even if these are selected already, click on them again. When you change objects with conflicting line, fill and color attributes, the requester cannot show the attributes for more than one object. Attributes which are not changed in the requester will not be changed when you close the requester. Clicking on a gadget, even if it is already selected, signals Art Expression to change that attribute for all selected objects.



Click on the *OK* gadget to close the requester.

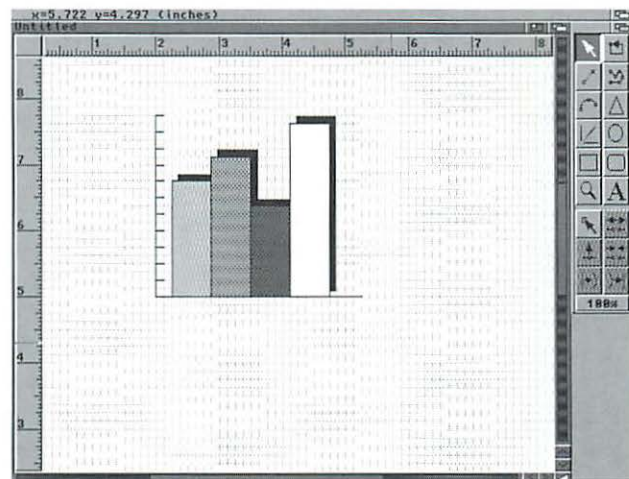
Lesson One

Changing Object Depth

Now you must put the bar shadows behind the actual bars since the *Transform...* command created the new ones on top of the originals. With all four black boxes selected, choose the *Send to Back* command from the *Object* menu. This will move the boxes behind all the other objects in the illustration window and will create the desired shadow effect.



All objects in an illustration exist on a three dimensional plane. Although Art Expression is not a three dimensional drawing program, objects have a third dimension in that they can be stacked on top of each other. The *Send to Back*, *Send Backward*, *Bring to Front*, and *Bring Forward* commands allow you to change the stack order of objects from the order in which they were created.



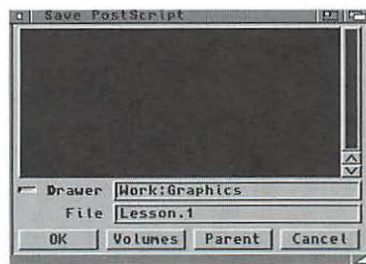
You have now completed the bar graph and are ready to print out your work. Before you go any further you should save your illustration and give it a name.

Saving Your Illustration

Your illustration is called *Untitled* because you have not saved it and given it a name yet. You should save your illustrations often as you work so that you do not lose much work if your computer has a problem, or if you make an error.



Choose the *Save As...* command from the *Project* menu. A file requester will open to name your illustration. Enter a name and choose a directory path in which to store your file. You can call this illustration *Lesson.1* or any other name which you find easy to remember. Click on the *OK* gadget to save the illustration file.

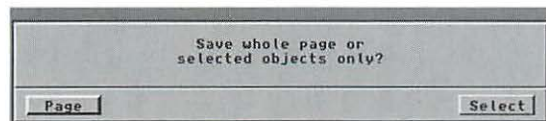


ASL save file requester for Workbench 2+



Arp file requester for Workbench 1.3

If an object is selected, a requester will open asking if you want to save the whole page or just the selected objects. Choose the whole page if this requester opens.



In summary, the steps to save a new illustration are:

1. Choose the *Save As...* command from the *Project* menu.
2. Select the file to save.

A file requester will open to select the file to save. Choose a filename and directory and click on *OK*.

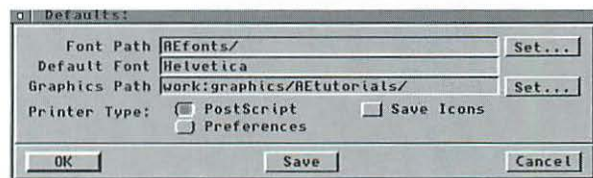
Printing Your Illustration

Normally drawing program users create graphics which will be incorporated into complete documents in a desktop publisher, but you may want to print your illustrations from Art Expression directly before importing them into a desktop publisher, or you may create finished work in Art Expression.

Choosing a Printer Driver

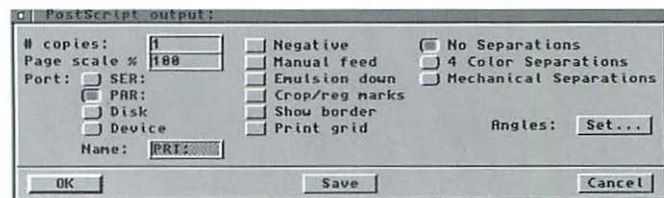
Before you print from Art Expression, ensure your printer is connected properly and ready for use. If you have a non-PostScript printer (dot matrix, inkjet or Hewlett Packard compatible laser) you must choose a Preferences driver before printing. See your Amiga manual for more information. If you have a PostScript printer, Art Expression will bypass Preferences and use its own driver.

If you have not already set your printer type, choose the *Defaults...* command from the *Settings...* menu and click on the radio button gadget for PostScript or Preferences, as appropriate.



Choose the *Print...* command from the *Project* menu. This opens a requester in which you can select various PostScript options if you are printing to a PostScript printer. Ensure that you choose the correct port for your printer setup. (i.e., parallel, serial, disk, device.)

If you are printing to a Preferences printer, this requester will not open and Art Expression will print one copy of the illustration directly to your printer.

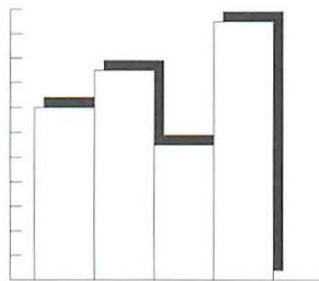
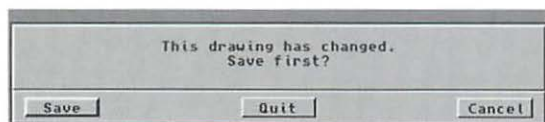


Ending the Lesson

Congratulations! You have completed your first Art Expression illustration. If you want to start a new illustration without leaving Art Expression you can choose the *Clear* command from the *Project* menu. This will remove all objects from the workspace and will reset the illustration name to *Untitled*. Alternatively, you can open an existing illustration with the *Open...* command.



You can leave Art Expression at this time by choosing the *Quit* command from the *Project* menu. If you have not already saved your work you will be prompted in a requester to save the illustration, quit Art Expression, or cancel the command. If you have just saved your work, Art Expression will quit immediately.



Finished bar graph created with this lesson



2

An Illustration Project



Lesson 2:

An Illustration Project

Lesson Goals

This tutorial gives you a complete illustration project. It will make you familiar with some of Art Expression's more advanced drawing and editing tools and will teach you how to create text objects and how to combine text and graphics in one illustration. You will also learn how to bind text to a curve and how to transform objects around a rotation point.

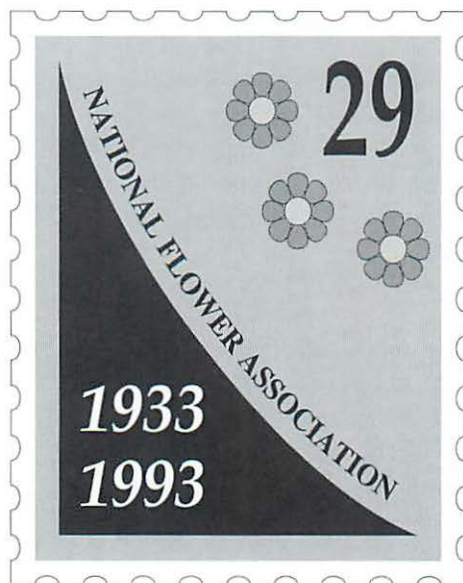
In this lesson you will learn how to:

- Open existing illustrations;
- Create text objects;
- Convert text to graphics;
- Group objects;
- Draw paths;
- Close paths;
- Align text to curves;
- Create shadowed text;
- Marquee selection;
- Set the rotation point;
- Transform objects;
- Create a new color; and
- Cut and paste objects.

Lesson Two

The Task: Creating a Postage Stamp

You have been given the job of creating a commemorative postage stamp for the 60th anniversary of the National Flower Association. A standard stamp layout has been provided for you. It is your task to build upon this template to create the final design.



Getting Started

Start Art Expression. If you have forgotten how, refer to the instructions on page 4 of lesson 1.

Setting Preferences for this Lesson

Before you continue you must set your Art Expression preferences to complete this tutorial successfully. Choose the following commands and select the appropriate options in each requester:

Settings/Drawing Units...

Inches (This tutorial is designed for inches but can easily be completed using centimeters or other drawing units.)

Settings/Drawing Prefs...

Draw Circle/Ellipse from Center = Off

Prompting = On

DoubleClick On = Off

Spring-Load Tools = Off

Spring-Load Text = On

Undo Available = On

Settings/Coordinates = toggle on

Settings/Rulers = toggle on

Settings/Show Grid = toggle on

Settings/Grid Snap = toggle on

Settings/Set Grid...

x: 0.25 inches y: 0.25 inches

Settings/Show Guides = toggle off

Settings/Guide Snap = toggle off

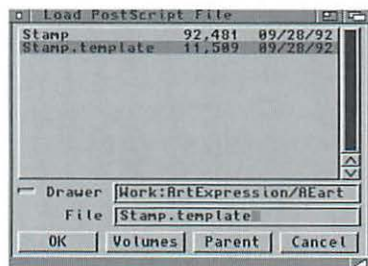
Screen Mode

It is recommended that this tutorial be completed in 16 color mode. If you have a 68000 computer, 16 color mode may be too slow for regular use. You can complete this tutorial in 4 color mode and switch to 16 color mode when needed to preview the colors. Use the *Screen...* command from the *Settings* menu to change the screen mode. Alternatively, you can work in *Outline Mode* and switch back to *Final Mode* to preview your illustration.

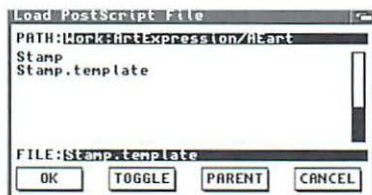
Opening Existing Illustrations



A standard postage stamp template has been provided for you. To open the file, choose the *Open...* command from the *Project* menu. A file requester will open to choose a title. Switch to the *AEart* directory and select a file titled *Stamp.template*. Click on the *OK* gadget when the file is selected to load the illustration.



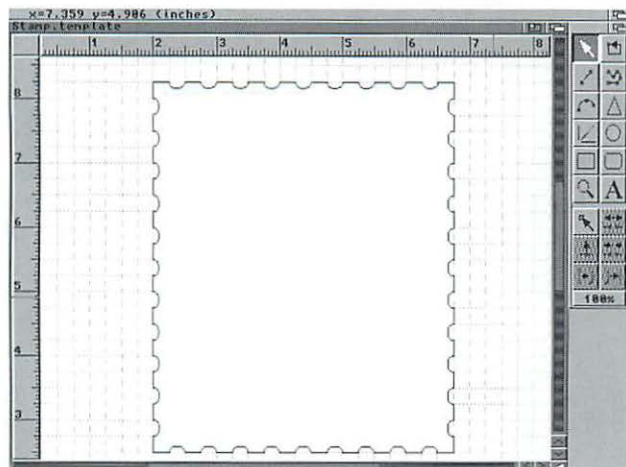
ASL open file requester for Workbench 2+



Arp file requester for Workbench 1.3

A template is a regular illustration file which you can use as the basis for future illustrations. You do not want to accidentally save over the template file so you should rename the illustration now. Choose the *Save As...* command and save the file as *Lesson.2* instead of *Stamp.template*.

You will create the stamp design larger than actual size because it is easier to work at a larger size. It can be reduced to the correct size later.



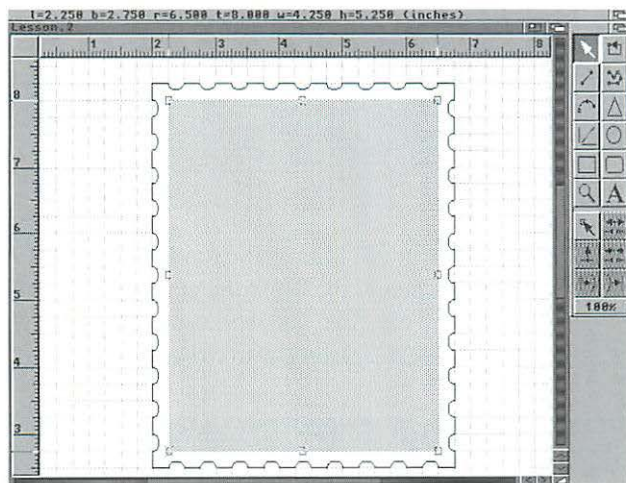
Drawing the Background



The background of the stamp (see the finished example on page 32) fills most of the stamp. Select the *Box* tool from the toolbox and draw a box 4.25" wide by 5.25" high. Start the box 0.25" from the top left corner of the stamp template (at position 2.25, 8.00"). You could also draw the box elsewhere on the screen and move it into position.



Select the *Object* tool from the toolbox. The box will be selected automatically. Choose the *Line/Fill...* command from the *Object* menu and change the box to 20% Blue.



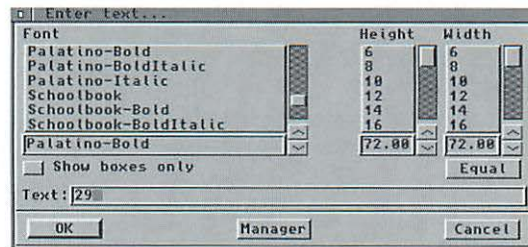
Lesson Two

Creating Text Objects

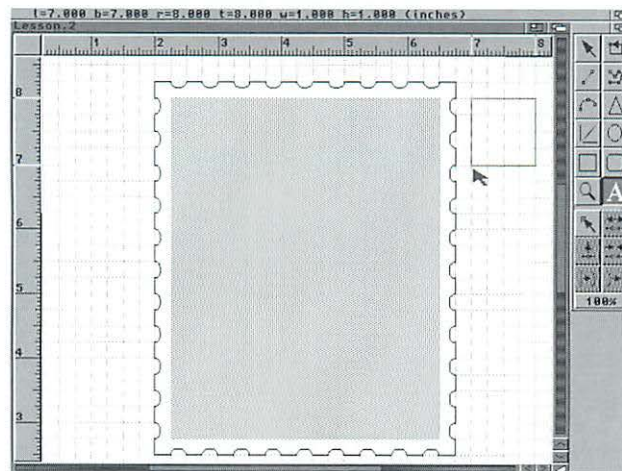
Now it is time to put the stamp price in the illustration. The “29” text object is set in Palatino Bold 72 point stretched to about 100 points high.

A

Text is a special type of object which is created in the *Enter Text* requester. Select the *Text* tool from the toolbox to open this requester. The Enter Text requester allows you to enter the text to place in the illustration and to choose its font and size.



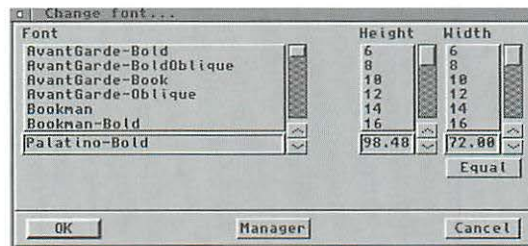
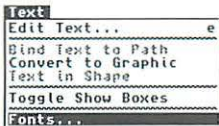
Choose Palatino Bold from the scrolling list for fonts. Use the scroll bar to view the portion of the list with Palatino. Click on Palatino Bold to select it. Enter “29” in the *Text*: gadget. Do not change the font size from 72 points high and wide. Click on *OK* to close the requester.



A box will appear on the screen at the mouse pointer's position. This shows the size of the text object and allows you to place the text anywhere on the screen. Put the mouse pointer anywhere in the illustration window and click the left mouse button. The text object will be placed into the illustration.

The text object can be manipulated in almost the same manner as any other object. It can be resized, rotated and transformed. Art Expression will have switched back to the *Object* tool automatically since *Spring-Loaded Text* is selected in the *Drawing Prefs...* requester.

Grab the bottom center size handle with the mouse pointer and drag it down two grid units (0.5"). Release the mouse button to redraw the text object at its new size. The text object will now be 72 points wide and approximately 100 points high. You can check this by choosing the *Fonts...* command from the *Text* menu. This opens a requester which allows you to change the font and size of selected text objects.



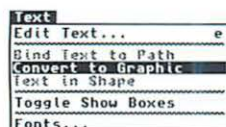
Do not make any changes in this requester. Click on *OK* or *Cancel* to exit the requester.

Converting Text to Graphics

Text objects cannot be edited as paths like other objects because they are defined as characters in a font and size. Text objects can be converted into graphic elements at any time. This is a one-way process but provides two major advantages: text can be edited as paths; points can be added, deleted and moved, and font files are no longer required for loading the illustration. This makes loading faster.

Once text is converted to graphics, it can no longer be edited as text. You cannot change the text in the text object with the *Edit Text...* command or change the font.

Lesson Two



i The top and bottom size handles for the original text object are higher and lower than the size handles of the graphic objects because fonts have extra space above and below the actual characters.

To convert the text object to graphics, choose the *Convert to Graphic* command from the *Text* menu while the text object is selected. The size handles around the text object will disappear and will be replaced with size handles around each former character. Both characters will become separate graphic objects.



Text object



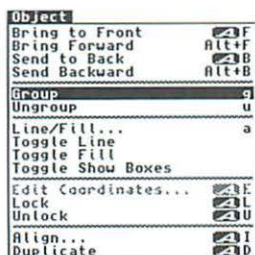
*Converted to
Graphics*

Grouping Objects

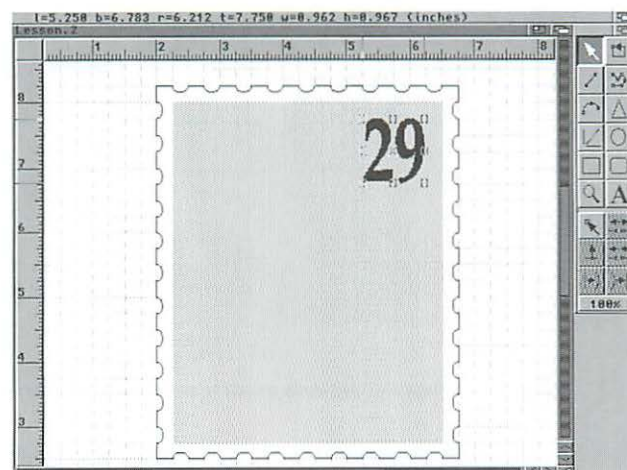
The two former characters of the text object are completely separate objects now. Their position relative to each other should not be changed. They can be move simultaneously to their new final position but it is easier to work with related objects if they are grouped first.

Groups are logical arrangements of objects. The entire group is treated as a single object. While you can no longer edit each object independently, you no longer need to worry about moving one object without moving a related object. Groups can be split apart at any time into their original objects.

Both objects should still be selected from the *Convert to Graphics* process. Choose the *Group* command from the *Object* menu. The size handles from around each of the separate objects will disappear and new size handles will appear around the group.



Move the text into position at the top right corner of the stamp. The left and top coordinates of the text group should be l:5.250, t:7.750.



Lesson Two

Drawing Paths

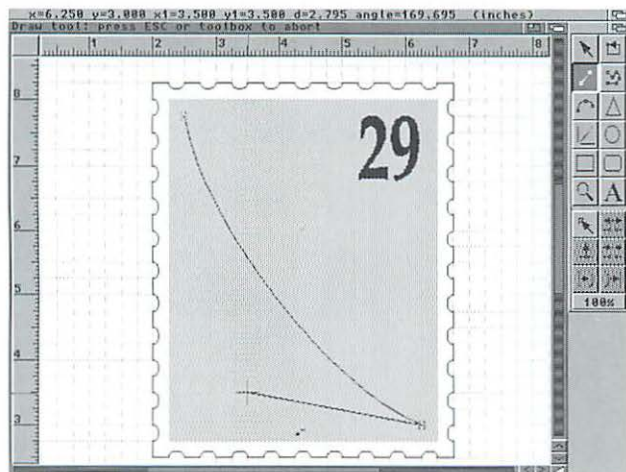
Until now, you have only drawn basic shapes in these lessons. Complex objects are similar to basic shape objects, but are drawn in a different manner. Basic shapes are drawn by selecting a starting point and dragging the mouse to define the size of the object. Complex objects are drawn by selecting a starting point and then defining each point in the path of the object. The points define the beginning and end of segments of the path.

Before you start a path you must deselect all objects. Paths can be continued from existing objects. If an object is selected, choosing a path tool will continue the path from its start point. To ensure all objects are deselected, press the *Space Bar*.



Choose the *Draw* tool from the toolbox. The mouse will change to a drawing crosshair. Move the mouse to approximately x:2.5, y:7.75. Click the left mouse button once to start the path but do not hold down the mouse button. Move the mouse point to x1:6.25, y1:3.0. A line will follow the mouse pointer to show the path segment you are going to define. Press and hold the mouse button. Drag the mouse up and to the left to define the shape of the curve. When the curve looks approximately like the curve below, release the mouse button. This ends the first segment in the path.

i Dragging the mouse at the end of a segment defines a curve segment. Clicking the mouse button at the end of a segment creates a line segment.



After the first segment has been ended, a line will be drawn from it to the mouse pointer. This indicates that you can define another path segment.

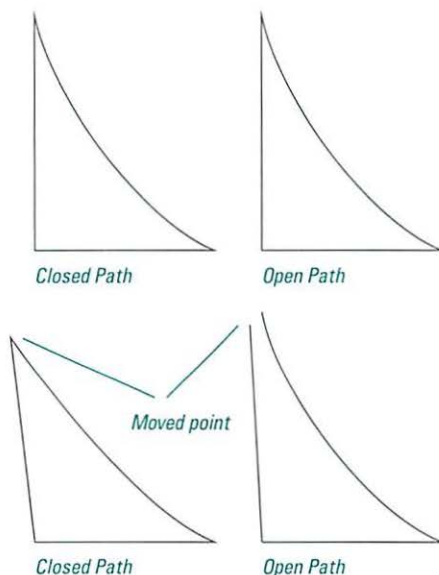
Move the mouse pointer to $x1:2.5, y1:3$. This time, simply click the left mouse button at this position. This will end another segment but it will not be a curve since you have not dragged the mouse.

To finish the path, we must draw a line from this point to the starting point. You could click the mouse at the starting point but the resulting object would not be a closed path. A closed path is one in which the start point is connected to the end point. Simply clicking at the start point does not close a path.



Select the *Close Path* tool from the toolbox. This will draw a straight line from the last path point to the start point and will close the path. If you had drawn a line by clicking the mouse at the start point you could still close the path by choosing the *Close Path* tool, but Art Expression would create an extra path point on top of the start point. While this will not spoil the appearance of the object, it creates an unnecessary point which makes it harder to edit the path later.

Open paths are not always obvious. For example, the closed path and open path below appear identical. It is only when you attempt to move the start or endpoint of the path that it becomes obvious that the path is open or closed.



Lesson Two

Using the *Close Path* tool also ended the path and returned you to the *Object* tool automatically.

In summary, the steps to draw a path with the Draw tool are:

1. Select the Draw tool.

The mouseform will change to a drawing crosshair.

2. Position the mouse crosshair. Click the left mouse button.

Click the left mouse button to start a path. (Do not drag the mouse.) A line will be drawn from the point at which you clicked.

3. Click to define a path point.

Click again elsewhere to define a path point and to draw a line segment. Drag the mouse instead of clicking to draw a curve segment. When you release the mouse button, a curve segment will be drawn in the shape you defined.

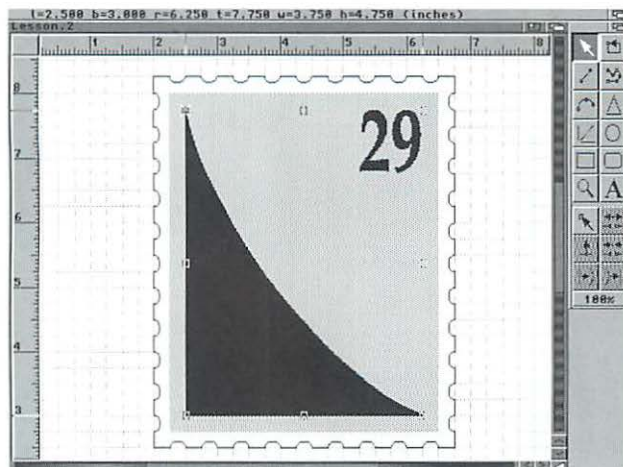
4. Click to define another path point.

Continue defining path segments as required.

5. End the path.

Press the *Esc* key or select the *Object* tool to end a path.

Choose the *Line/Fill...* command from the *Object* menu and change the new object to solid Blue. Now you are ready to create the text to place along the curve of this object.



Aligning Text to Curves

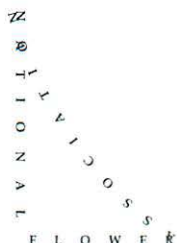
Art Expression can bind text to curved paths. You must designate a path to follow and a text object to align to it.



Create a new text object by selecting the *Text* tool. Enter the text “National Flower Association” in the *Text:* gadget. Change the font and size to Palatino Bold 22 point. Since 22 points is not one of the options in the *Height* scrolling list gadget, you must type “22” into the *Height* text gadget. Click on the *Equal* gadget to make the width equal to the height. You could have entered “22” into the *Width* gadget, too, but it is easier to click on the *Equal* gadget.

Click on *OK* to close the requester. Place the text object anywhere in the illustration window. It will be moved soon so it does not matter where it is placed.

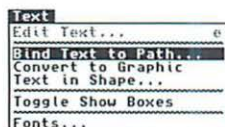
We want to align our text object to the curve of the object you just created. However, if you attempt to align the text to this object, it will be aligned to the curve and the two line segments, resulting in something like this:



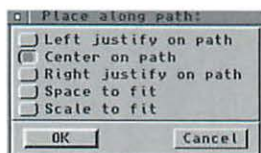
To avoid this, you must create a temporary object which is made up of a curve only. Press the *Space Bar* to deselect the first object. Select the *Draw* tool and click at the start point to start another path. Move to the bottom right end of the curve and drag the mouse to define the curve segment. Make it exactly match the first curve segment. Release the mouse button to end the curve segment.

Instead of clicking on another point to define another segment, end the path now by pressing the *Esc* key. This ends the object and returns you to the *Object* tool.

Lesson Two

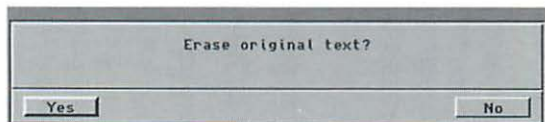


Now you need to select both the text object and the new curve simultaneously. The curve should already be selected so *Shift* click on the text object. Choose the *Bind Text to Path...* command from the *Text* menu. This opens a requester to allow you to set the formatting for the text.

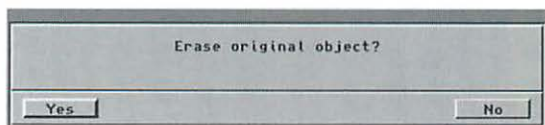


Choose the *Center on Path* option by clicking on its radio button gadget. This will center the text at its current size in the middle of the curved path. Click on the *OK* gadget to close the requester.

You will then be asked by Art Expression if you want to erase the original text object. It is no longer required, so click on the *Yes* gadget.

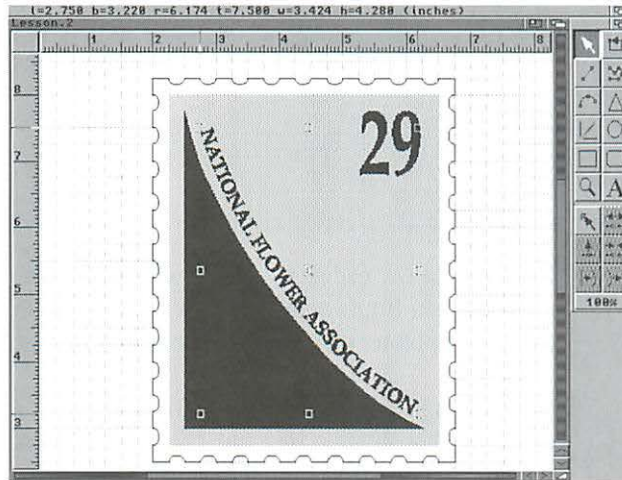


Another requester will open asking if you want to erase the original object. The temporary curve is no longer required so click on the *Yes* gadget in this requester.



Art Expression will now redraw the screen with the text bound to the curved path. Each character will be converted to a separate graphic object in this process and each will have its own set of size handles. To reduce the screen clutter and to make it easier to manipulate these new objects, choose the *Group* command from the *Object* menu now while they are all selected.

The text needs to be offset slightly from the blue curve. Drag the group one grid unit (0.25") to the right.



Creating Shadowed Text

The next step is to create the dates at the lower left corner of the stamp. The shadowed appearance of the text is created by positioning a white text object slightly offset over a black text object.



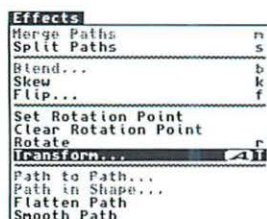
Create a new text object by selecting the *Text* tool. Enter "1933" into the *Text*: gadget. Change the font to Palatino Bold Italic and the size to 48 points high and wide. Click on *OK* to close the requester.

Position the mouse pointer at l:2.75, b:4.0. Click the mouse button to place the text object. This will be the black text object. To make it easier to handle, choose the *Convert to Graphic* command from the *Text* menu. Choose the *Group* command from the *Object* menu immediately.

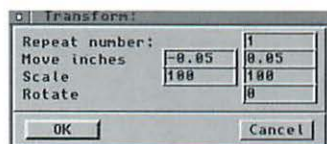


This is a good time to save your illustration in case of a power interruption or other problem. Press the Space Bar to deselect all the objects then choose the *Save* command from the *Project* menu to save your work under its existing name. If you do not deselect the objects before saving, you will be prompted to save the page or only the selected objects.

Lesson Two



Now you can create the white text object. Instead of creating a new text object you can duplicate the original. Choose the *Transform...* command from the *Effects* menu. Enter “1” into the *Repeat Number* text gadget, and offsets of “-0.05” and “0.05” into the two *Move* gadgets. Both *Scale* gadgets should remain at 100 and the *Rotate* gadget should be left at 0°.



Click on the *OK* gadget to close the requester. The group will be duplicated up to the left. Both copies will now be selected. Press the *Space Bar* or click the mouse pointer on a blank area of the window to deselect them.

Now select just the copy which will be on top of the original. Ungroup the group by choosing the *Ungroup* command from the *Object* menu. Choose the *Line/Fill...* command from the *Object* menu and change the four character objects to solid white. The line style should be left as *None*. Regroup the objects by choosing the *Group* command again while they are still selected.

Repeat the process for the “1993” text object. (See the finished example on page 32.) Place this text object at l:2.75, b:3.25. When you are done you will have four groups of four objects.

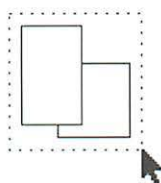


Marquée Selection

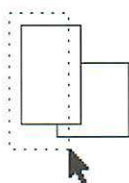
You should group all four groups together now to avoid changing the shadow offsets accidentally. Groups can be composed of individual objects and other groups. Since the groups are stacked on top of each other, it is difficult to select all four without moving them accidentally. You can use marquée selection to select them all at once.

With the *Object* tool selected, draw a “rubber band box” around one or more corners of each of the groups. The box will be made up of a dashed line, or marquée, and is not really drawn on the illustration. Any object with a corner in the box will be selected. You should start the marquée box on a blank area of the illustration. If you start it on top of another object, that object will be selected and moved.

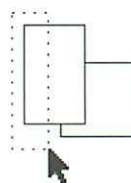
If there is no clear area to start a marquée box, you can hold down the *Alt* key and then drag the mouse to draw a box. The *Alt* key forces Art Expression to ignore the object below the start point.



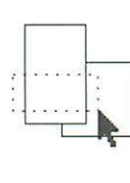
Both boxes will be selected.



Both boxes will be selected.

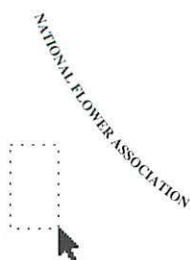


Only the left box will be selected.

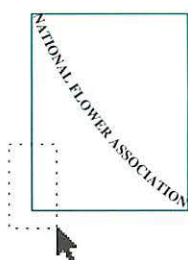


Neither box will be selected.

Start your marquée box above and to the left of the groups and drag down to the right around their left corners. Release the mouse button and size handles will appear around all of them. If you drag too far, you may select other objects as well because the corners of their bounding box may be inside the marquée.



Text will be selected.



A corner of its bounding box is in the marquée box.

Lesson Two

If you accidentally select another object, you can either draw another marquee box at a different size, or you can deselect the offending object. To deselect one object when other objects are selected, hold down a *Shift* key and click on the object. If you miss an object with a marquee box, you can add it by clicking on it by holding down a *Shift* key and clicking on it. *Shift* acts as a way to select and deselect objects without affecting the selected state of other objects.



Once you have selected the four groups, choose the *Group* command from the *Object* menu to make them into a single group.

Transforming Objects

The flowers in the upper right corner of the stamp are easy to create with Art Expression's *Transform...* command. First you need a clean area of the screen to work on. Drag the horizontal scroll bar all the way to the left. This will show you the pasteboard to the left of the illustration. You can draw the flowers here and then paste them into the illustration.

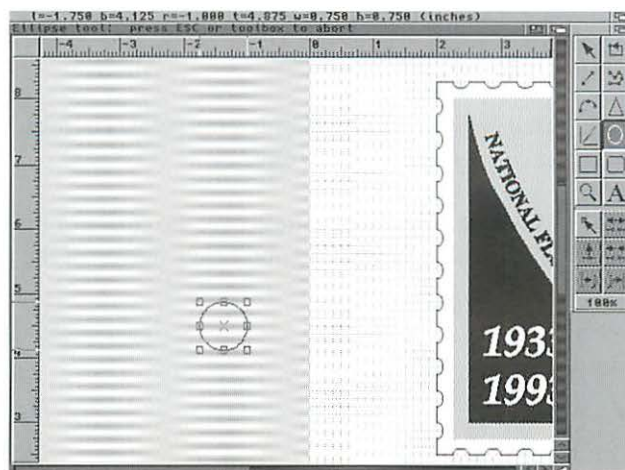
You will need tighter grid spacing to draw the flowers correctly. Change the grid to eighth of an inch spacing with the *Set Grid...* command from the *Settings* menu. Change the horizontal and vertical grid spacing to 0.125".



i Note that the *Shift* key must be pressed after starting the ellipse. If you press *Shift* before starting the circle, Art Expression will not draw an ellipse.

Choose the *Ellipse* tool from the toolbox. You must draw a true circle for the center of the flower. The *Ellipse* tool will allow you to draw an ellipse of any aspect ratio. While it is fairly easy to ensure that small circles are indeed circles, it is easier to modify the *Ellipse* tool by holding down a *Shift* key while drawing. The *Shift* key is a constraining key which restricts the *Ellipse* tool to drawing circles. The *Shift* key can also be used with the *Box* tool to draw squares.

Draw a circle with a radius of 0.375 inches. To draw a circle, position the drawing crosshair over a clear area in the window and press the mouse button. Drag the mouse to define the size of the circle. Press and hold a *Shift* key after starting the ellipse to restrain the *Ellipse* tool to circles. When the *Coordinate Bar* shows that the radius is 0.375", release the mouse button.



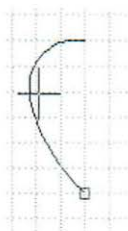
Lesson Two

i Temporarily increasing the magnification level for this step may help you draw more accurately.

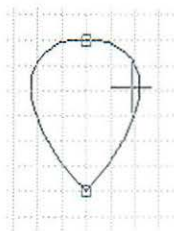


Drawing the petals is easy. First, deselect the circle by clicking on a blank area or by pressing the *Space Bar* to avoid continuing its path when you draw the petals. Choose the *Draw* tool from the toolbox and start a path by clicking the mouse button in the window. Start the path on the page instead of on the pasteboard so that you can see the grid spacing.

Once the path is started, move the mouse six grid units (d:0.75") up. Press and hold the mouse button to define the next path point. Drag the mouse two grid units down (0.25") and two units to the left to define the shape of the curve. Release the mouse button to end the first curve segment.

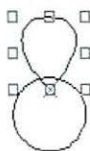


Move the mouse back to the start point. Press and hold the mouse button to define the next path point. Draw the mouse four grid units up (0.5") and two to the right (0.25") to define the shape of the curve. Release the mouse button to end the second curve segment.



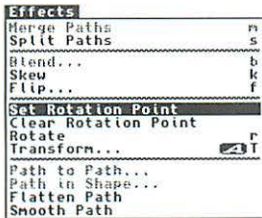
That is the end of the flower's top petal. To finish the object, press the *Esc* key or select the *Object* tool.

Move the petal into position over the center of the flower. The petal's bottom point should be one grid unit below the top of the circle.

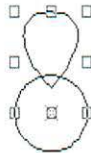


Setting the Rotation Point

You need to duplicate the petal around the center of the flower. First you must set the rotation point to the center. The rotation point of an object is always visible and is shown as an “X” symbol. The rotation point for the petal is the bottom of the petal which is 0.25" from the center of the circle.

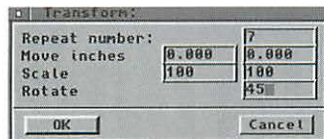
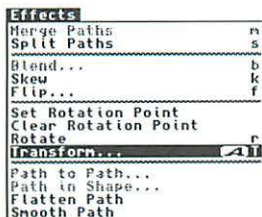


Choose the *Set Rotation Point* command from the *Effects* menu. This will add full-screen crosshairs to the mouse's drawing crosshairs to help you choose the rotation point. Center the crosshairs on the circle and click the mouse button. The rotation point will be moved to the center of the circle. Note that the bounding box of the petal will be larger since it includes the rotation point, but this does not affect the size of the petal itself.



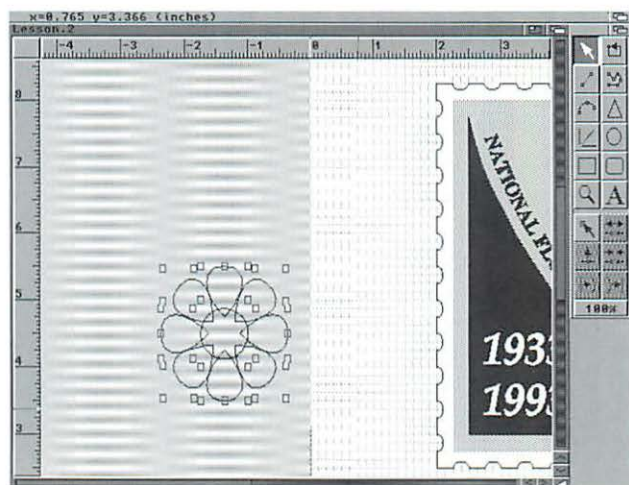
Transforming Objects with Rotation

Now you are ready to transform the petal to create the other seven petals. While the first petal is selected, choose the *Transform...* command from the *Effects* menu. Enter “7” into the *Repeat Number* gadget. This will create 7 copies of the petal. Make the *Move* offsets equal to “0” and the *Scale* values to “100”. Enter “45” into the *Rotate* text gadget. This will rotate each successive copy 45° around the rotation point.



Click on the *OK* gadget to close the requester and to transform the single petal into a total of eight petals.

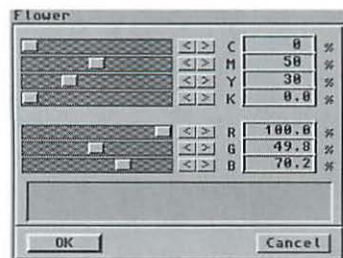
Lesson Two



Creating a New Color

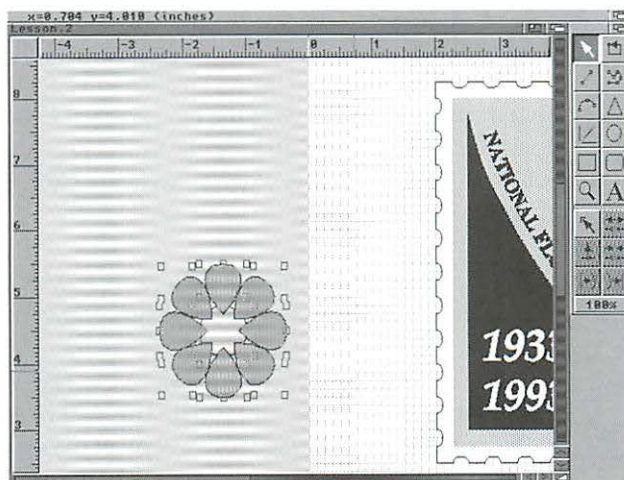


The flower petals are intended to be rose colored. The default Art Expression palette does not have rose in it so you must create your own color. Choose the *Line/Fill...* command from the *Object* menu. Place the text cursor in the *Fill Color* text gadget below the *Fill Color* scrolling list. Press *Rt-Amiga X* to clear the text gadget. Enter "Flower" for the name of your new color. Click on the *Add* gadget beside the *Fill Color* scrolling list to add it to the palette. This will open another requester to specify the color components.



Colors can be specified in either the CMYK (Cyan, Magenta, Yellow, Black) or RGB (Red, Green, Blue) models. Use the CMYK model and enter values of 0, 50, 30, 0 into the four text gadgets in this order. When you press Return in the text gadgets, the color in the sample color box will change to show you what the color looks like. Click on the *OK* gadget to close the requester.

Now click on the *OK* gadget in the *Line/Fill...* gadget to make the petals solid “Flower” colored. The petals will be redrawn in the new color.



The petals should be behind the flower's center so choose the *Send to Back* command from the *Object* menu to move them behind the circle.

Select the circle. Remember to click on its stroke to select it. Change its color to solid Yellow with the *Line/Fill...* command. Choose the *Group* command from the *Object* menu to group the petals together with their center. You have now created the flower and are ready to place it into the illustration. This is a good time to save your work if you have not saved it recently.

Cutting and Pasting Objects

The flower was created at larger than actual size so you must make it smaller. Choose the *Cut* command from the *Edit* menu while the grouped flower is selected. This will remove the selected flower from the illustration and store it in Art Expression's buffer. The buffer is part of your computer's memory used for storing selected objects for later pasting.

Grab the horizontal scroll bar and drag it to the right to center it in the scroll box. This will put the stamp illustration back in the center of the window. Take a look at the finished stamp on page 32 to see how the flowers are arranged.

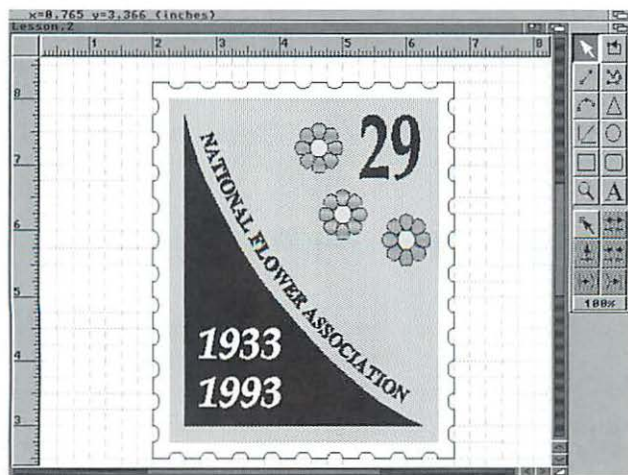
Lesson Two

Choose the *Paste* command from the *Edit* menu. This will change the mouse-form to a picture frame symbol. This represents the top left corner of the object to paste. Position the mouse at x:4.25, y:7.625".

If you click the mouse button now, the flower will be pasted at its former size. You must make the flower smaller so you will drag paste it. Press and hold the mouse button. Drag the mouse down to the right. Press and hold down a *Shift* key. This will keep the aspect ratio (horizontal vs vertical size) equal to the original ratio of the flower. Note how holding down a *Shift* key affects your ability to paste the flower.

When the flower's dimensions are w:0.75, h:0.75" in the *Coordinate Bar*, release the mouse button to paste the flower into the illustration.

To make the other two copies the same size, copy the new flower with the *Copy* command from the *Edit* menu. This will replace the large flower in the buffer with the new flower. Paste a copy of the small flower at approximately x:4.625, y:6.5". Because the copy in the buffer is the correct size, you do not need to drag paste the flower. Simply select the *Paste* command and click in the illustration when the picture frame is at the correct coordinates. Paste the third flower in the same manner at x:5.625, y:6.25".



Congratulations! You have completed the second tutorial. Save your work and print out your finished illustration. Practice your new skills on your own projects until you are ready for the third lesson. You should be comfortable selecting and editing objects and with using the *Draw* tool before continuing.

Techniques and Tracing



Lesson 3:

Techniques and Tracing

Lesson Goals

This tutorial builds upon the lessons learned in the last lesson and introduces you to tracing bitmap pictures. You will learn how to edit complex paths and will explore some of Art Expression's more advanced features.

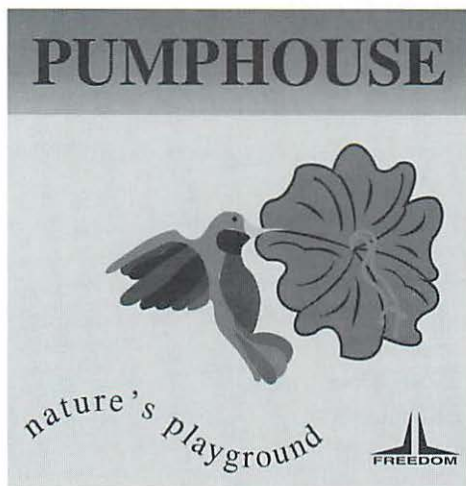
In this lesson you will learn how to:

- Open pictures in BME;
- Convert bitmap pictures into structured drawings (autotracing) in BME;
- Add path points;
- Delete path points;
- Move path points;
- Flip objects;
- Blend objects and colors; and
- Place graphics.

Lesson Three

The Task: Designing a Compact Disk Jewel Box Cover

You have been given the task of designing a cover for the liner notes in a compact disk jewel box. You have been supplied with suggested artwork in bitmap format which you must convert to a structured drawing to free it of jaggies.



Getting Started

Setting Preferences for this Lesson

Before you continue you must set your Art Expression preferences to complete this tutorial successfully. Choose the following commands and select the appropriate options in each requester:

Settings/Drawing Units...

Inches (This tutorial is designed for inches but can easily be completed using centimeters or other drawing units.)

Settings/Drawing Prefs...

Draw Circle/Ellipse from Center = Off

Spring-Load Tools = Off

Prompting = On

Spring-Load Text = On

DoubleClick On = Off

Undo Available = On

Settings/Coordinates = toggle on

Settings/Rulers = toggle on

Settings/Show Grid = toggle on

Settings/Grid Snap = toggle on

Settings/Set Grid...

x: 0.25 inches y: 0.25 inches

Settings/Show Guides = toggle off

Settings/Guide Snap = toggle off

Screen Mode

It is recommended that this tutorial be completed in 16 color mode. If you have a 68000 computer, 16 color mode may be too slow for regular use. You can complete this tutorial in 4 color mode and switch to 16 color mode when needed to preview the colors. Use the *Screen...* command from the *Settings* menu to change the screen mode. Alternatively, you can work in *Outline Mode* and switch back to *Final Mode* to preview your illustration.

Lesson Three

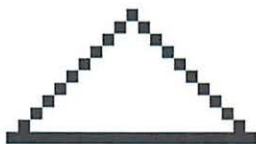
Autotracing

If you already understand the difference between bitmap pictures and structured drawings, skip the explanation below and proceed to the next section on this page (*BME trace*).

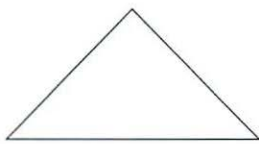
Bitmaps vs Structured Drawings

Computers can use two types of graphics: bitmap pictures and structured drawings. Bitmap pictures are a matrix of dots which can be assigned various colors. If the size of the picture is increased, programs must interpolate and add more dots between the existing dots. This leads to jaggies and banding patterns. Art Expression is a structured drawing program and does not load bitmap pictures for editing.

Structured drawings are defined by points which have coordinates. Lines and curves are drawn between these points and areas are filled in order to create drawings. When printed they must be converted to pixels (dots), but they can be resized to any size and still printed at the highest resolution available on your printer. Art Expression can load structured drawings for editing and printing.



Bitmap picture of a triangle



Structured drawing of a triangle

BME trace

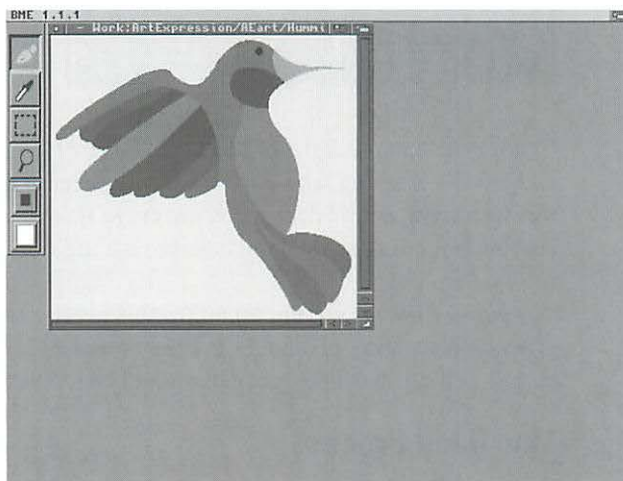
BME is a BitMap Editor. It allows you to load, edit and save bitmap pictures. These pictures can be converted into structured drawings with BME's built-in autotracer. Autotracing is the process of converting a bitmap picture to a structured drawing. BME examines the relationship between each dot in the original picture and converts groups of pixels into lines, curves and fills in a structured drawing file. The resulting file can then be edited in Art Expression and printed without jaggies.

Opening a Picture to Trace



For more information on starting BME and using its *Trace* feature, refer to the BME manual (and addendum) provided with Art Expression.

The first step in your CD design is to trace the artwork provided. Start BME by double clicking on its icon. Choose the *Open...* command from the *Project* menu. A file requester will open to choose a file to open. Select the *Hummingbird.ILBM* file from the *AEart* drawer. Click on the *OK* gadget to close the file requester and to load the picture into a picture window.



68000 Users

If you have an unaccelerated Amiga 500, 600, 1000, 1500 or 2000, auto-tracing this picture will take a while. There is a reduced version in the *AEart* directory called *HummingbirdSmall.ILBM* which you can trace instead. The quality will be lower but tracing time will be several times faster.

Selecting the Background Color

You must select the background color before you can trace a picture. The background color will not normally be traced (unless you select that option). This prevents BME from double tracing the picture needlessly. BME always chooses color 0 as the background color, but some pictures do not have the background color set to this color. If the color is set incorrectly, choose the *Eyedropper* tool and click on a dot with the desired background color. The background color for the Hummingbird picture is set to white which is the correct color for this picture.

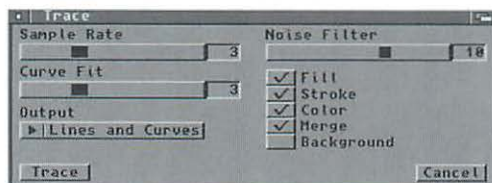


Lesson Three

Trace Options



Choose the *Trace...* command from the *Area* menu. This opens a requester from which you can select options for the autotracing process.

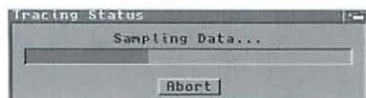
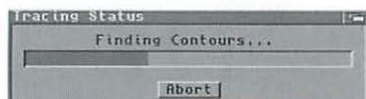


Change the *Sample Rate* to 3 and the *Curve Fit* to 3 by dragging their slider gadgets. Decreasing the sample rate will increase the number of points used by the autotracer and decreasing the curve fit will create longer and better curves. Both of these will increase the tracing time by a small amount.

The *Noise Filter* is not important for this picture because there is no background noise (stray pixels). Leave the output as *Lines and Curves* for the best output. All the checkbox gadgets should be left in their default state.

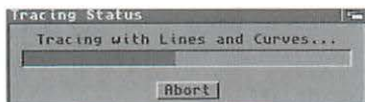
The Trace Process

Click on the *Trace* gadget in the *Trace* requester. The requester will close and BME will begin tracing the picture. Several status requesters will open to keep you informed of the trace process. BME will first find the edges of the picture, then find the contours of each color. Then BME will sample the data. The *Sample Rate* setting reduces the number of pixels used to determine the position of lines and curves, but increases the speed of the trace.



i The *Trace* status requesters show the number of objects traced out of the total number to trace. The status requesters are not an accurate reflection of the time remaining because some objects are very large and others very small. The status bar may not move for some time on slow machines when a complex object is being traced.

The final status requester appears while BME is actually converting the bitmap picture into a structured drawing. A bright green line will be shown on top of the lines and curves being traced. You can move the status requester by dragging its *Move Bar* to another area of the screen so that you can watch BME trace the picture.



Saving the Trace

When BME has finished tracing the picture, it will open a file requester to save the drawing file. Traced pictures are always saved in IFF DR2D format for use in programs such as Art Expression and PageStream. Ensure that you pick a name other than `Hummingbird.ILBM` for the output file or you will overwrite the original bitmap picture with your structured drawing. Change the name to `Hummingbird.DR2D` and click on the *OK* gadget. The file requester will close, BME will save the drawing, and the BME picture window will be redrawn.

Quitting BME

You can now exit BME by choosing the *Quit* command from the *Project* menu.

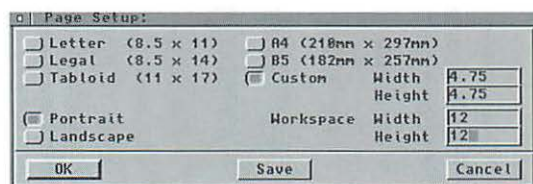


Lesson Three

Configuring the Workspace



Start Art Expression by double clicking on its program icon. After the screen appears, choose the *Page Setup...* command from the *Project* menu. The *Page Setup* requester will open. Choose the *Custom* page size radio button gadget. Enter "4.75" into its *Width* and *Height* text gadgets. Change the workspace size to any size with which you are comfortable. Click on the *OK* gadget to close the requester.



Viewing the Page

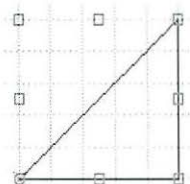
Most of the screen will be taken up by the pasteboard now. Choose the *Full Page* command from the *View* menu. This will redraw the screen to show the entire page stretched to fit in your window.

Editing Paths

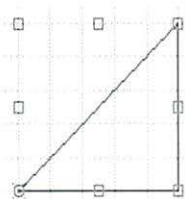
The first task is to draw the record company logo for the bottom right corner of the CD liner cover. It consists of two filled objects and the name of the company.



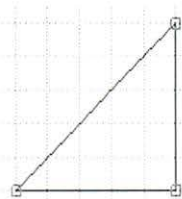
Select the *Draw* tool from the toolbox. Start a path in the center of the screen. Move the mouse five grid units (1.25") to the right and click the left mouse button to end the first line segment. Move the mouse five grid units (1.25") up and click the left mouse button again to end another line segment. Select the *Close Path* tool from the toolbox to make a closed triangle.



The *Object* tool will be selected automatically and the triangle object will be selected. Choose the *Edit Points* tool from the toolbox. This will remove the *size handles* and replace them with *point handles*.



Object selected with the Object tool.



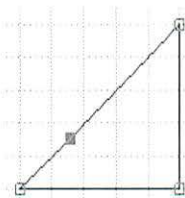
Object being edited as a path with the Edit Points tool.

The *Edit Points* tool is used to edit the path of an object. Only one object can be edited at one time. You can add, delete, join, split and align points with the *Edit Points* tool. You can also convert line segments to curves and curve segments to lines.

Adding and Deleting Points

i Adding a point to a line segment subdivides it into two line segments. Adding a point to a curve segment subdivides it into two curve segments.

Now you must add a point to the diagonal line in the triangle. Hold down the *Alt* key and click anywhere on the diagonal line. Another point handle will appear at the point where you clicked. *Alt Clicking* adds points to paths. The segment in which the point is inserted will be subdivided into two segments.



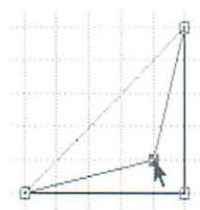
Add another point to the vertical line. A point handle will appear at that position. You can delete points easily by selecting the point to delete. Click on the point handle at the point you just created to select it. The point handle will be a solid color when it is selected, instead of an empty handle. Select the *Delete Points* tool to remove the point from the path.



Lesson Three

Moving Points

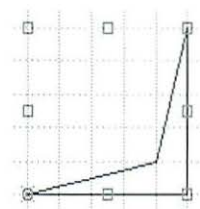
Path points can be moved by moving their point handles. Select the first point you added and drag it with the mouse one grid unit to the left and one grid unit above the bottom right path point.



Flipping Objects



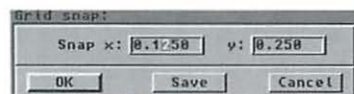
Choose the *Object* tool. The point handles will disappear and the size handles and rotation point will reappear.

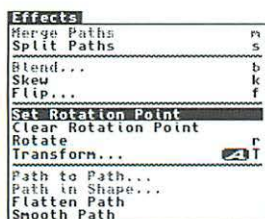


Instead of drawing the facing object as shown in the completed logo on page 64, you can copy and flip the original object. Objects can be flipped horizontally or vertically about their rotation points. The rotation point for this object is its bottom left corner as shown by the "X" symbol. This must be moved 1/8th of an inch to the right of the object.

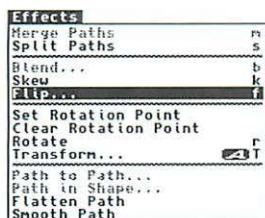
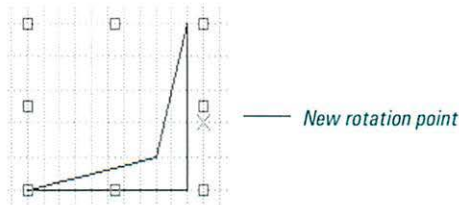


Choose the *Set Grid...* command from the *Settings* menu and change the horizontal grid spacing to 0.125". Leave the vertical grid spacing at 0.25".

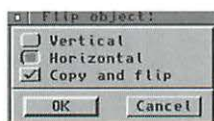




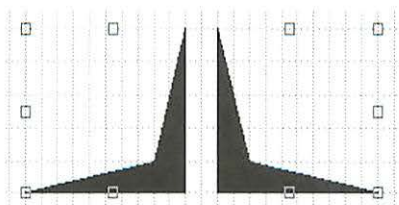
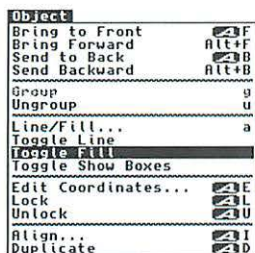
The object will still be selected when you return to the *Object* tool. Choose the *Set Rotation Point* command from the *Effects* menu. Full-screen crosshairs will appear. Set the rotation point one grid unit (0.125") to the right of the triangle. The vertical position is not important, but you should keep it within the boundary of the triangular object.



Choose the *Flip...* command from the *Effects* menu. A requester will open to select horizontal or vertical flipping. You can also select whether to flip the original object or to create and flip a copy of the object. Select the *Horizontal* radio button gadget and the *Copy and flip* checkbox gadget to flip a copy of the triangular object horizontally.



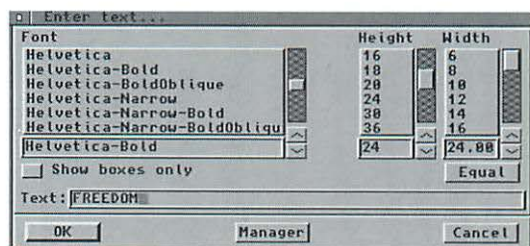
The triangular objects must be solid black. Instead of choosing the *Line/Fill...* command to open its requester, simply select the *Toggle Fill* command from the *Object* menu.



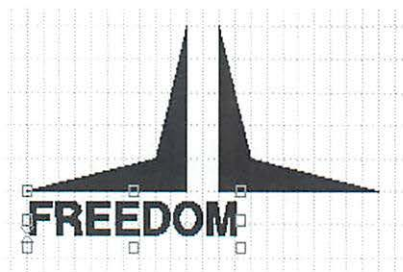
Lesson Three

Finishing the Logo

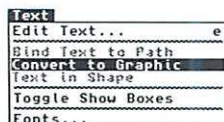
Only a few steps remain to complete the logo. Create a text object by selecting the *Text* tool from the toolbox. Choose Helvetica Bold from the font selector and change the height and width to 24 points. Enter "FREEDOM" in the *Enter Text* gadget and click on the *OK* gadget to close the requester.



Position the text object anywhere under the triangular objects. Drag the object until its top left corner touches the bottom left corner of the left triangular object.



Stretch the text wider to fit under the two triangular objects by dragging its center right size handle to the right. Make the right edge of the text object equal to the right edge of the right triangular object. Choose the *Convert to Graphic* command from the *Text* menu to reduce the text object to separate graphic objects.



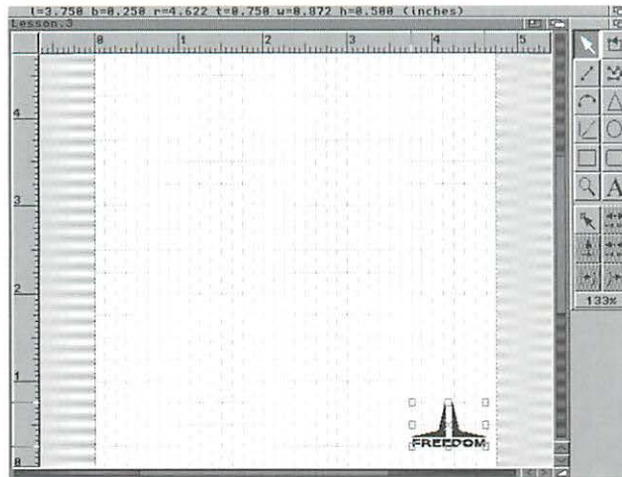
Draw a marquee box around all the objects to select them. Make them into one object with the *Group* command from the *Object* menu. The logo is now finished and ready for placement.



Cut the logo out of the picture by choosing the *Cut* command from the *Edit* menu. The logo will disappear and will be copied into the paste buffer. Choose the *Paste* command. The mouseform will change to a picture frame shape. Position the mouse at x:3.75", y:0.75". Press and hold a *Shift* key to constrain the paste to a 1:1 aspect ratio. Hold down the left mouse button and drag the mouse down to the right. When the height coordinate is h:0.500", release the mouse button and then the *Shift* key. The logo will be pasted down at the desired size.



Save your work now by choosing the *Save* command from the *Project* menu. Name this illustration Lesson.3.



Lesson Three

Blending Colors

The top of the CD liner cover is a magenta to cyan blend. Art Expression allows you to blend colors together to create smooth transitions between colors.



Select the *Box* tool from the toolbox and draw a box one grid unit high (0.25") and the width of the page (4.75"). Select the *Object* tool after drawing the box.



Choose the *Edit Coordinates...* command from the *Object* menu to change the box's position and size. Change the coordinates to left: 0", top: 4.75". Select the radio button gadget for width and height. Change these to width: 4.75" and height: 0.05". Click on the *OK* gadget to close the requester.



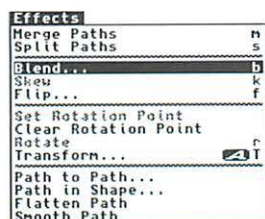
The box will be moved to the top of the page and resized to a wide, thin box. Choose the *Line/Fill...* command from the *Object* menu to change the box's color. Choose Magenta from the *Fill* color selector on the right and choose a line style of *None* on the left. Click on the *OK* gadget to close the requester.





Choose the *Copy* command from the *Edit* menu. This will put a copy of the magenta box in the paste buffer without affecting the existing box. The previous contents of the paste buffer (the record company logo) will be replaced with the box.

Choose the *Paste* command and paste a copy of the box 1.25" below the first box (x:0", y:3.75"). Choose the *Line/Fill...* command again for this box. Change its fill color from Magenta to Cyan. Click on the *OK* gadget to close the requester.



Select both boxes. The easiest way to do this is to draw a marquee box around their left or right edges. Choose the *Blend...* command from the *Effects* menu. This will open a requester to choose the start and end objects for the blend. The order is not important for this blend so select the *No* gadget to close the requester without changing the blend order.



Now you must calculate the optimum number of blend steps.

distance / step size = number of steps

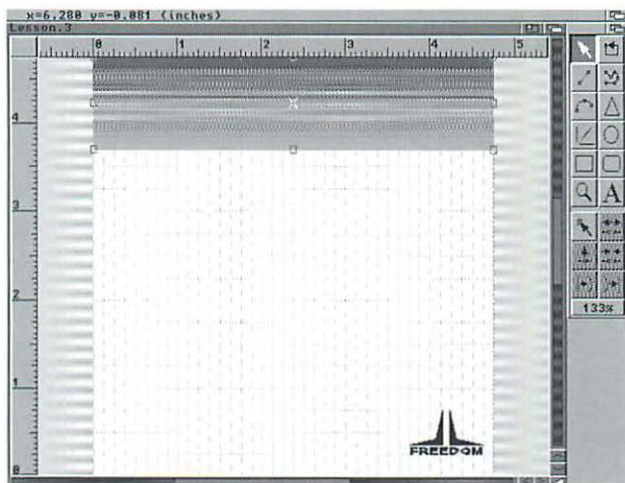
1.25 / 0.05 = 25 steps



Enter "25" into the text gadget and click on the *OK* gadget to close the requester. Art Expression will create 23 intermediate objects (the two original objects are part of the 25 steps), changing the color gradually from cyan to magenta.

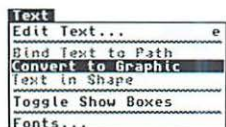
All 25 objects will be selected after the blend so select the *Group* command from the *Object* menu to make them into one object.

Lesson Three

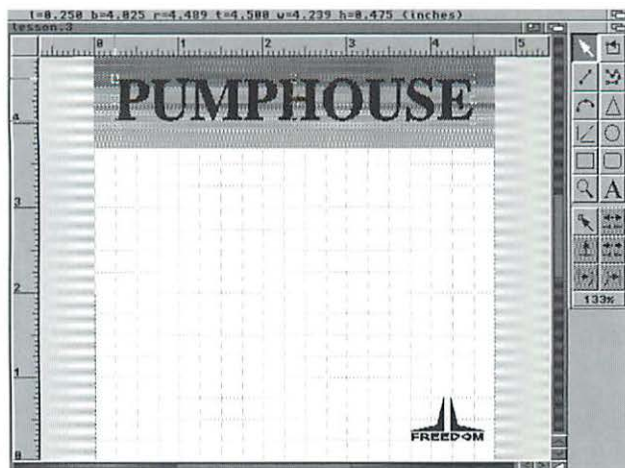


A

Now you can put the text object for the band name on top of the blend. Create a new text object by selecting the *Text* tool from the toolbox. Choose Times Bold 48, 48 point. Enter the name “PUMPHOUSE” into the *Enter Text* gadget. Click on the *OK* gadget to close the requester.



Place the text object anywhere in the window. Choose the *Convert to Graphic* command from the *Text* menu and then use the *Group* command from the *Object* menu to group the characters into one object. Move the grouped name to l:0.25, t:4.5.



Aligning Text to a Curve

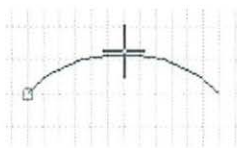
The album name in the lower left corner of the CD cover (see page 58) is bent in the shape of a sine wave. To flow text in a curved shape like this, you must draw a curve in the desired shape, create a text object, and then align the text object to the curve.



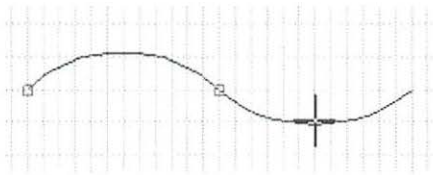
Create the text object first. Select the *Text* tool from the toolbox and choose Times Bold 24, 24 points. Enter “nature’s playground” into the *Enter Text* gadget. Click on the *OK* gadget to close the requester.



Now you must draw the curve. Select the *Draw* tool from the toolbox and click the left mouse button to start a path in a clear area of the illustration window. Move the mouse 12 grid units (1.5") to the right. Press and hold the left mouse button. Drag the mouse up one grid unit (0.25") and center it over the segment to make a uniform curve (0.75" from each end of the curve). Release the mouse button to end the curve segment.

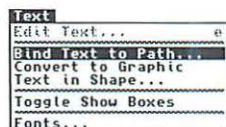


Move the mouse another 12 grid units (1.5") to the right of the first segment. Press and hold the left mouse button. Drag the mouse down one grid unit (0.25") and center it under the segment to make a uniform curve opposite that of the first curve. Release the mouse button to end the second curve segment.

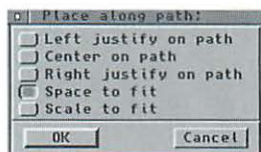


The curve is finished now so press the *Esc* key or select the *Object* tool to end the path.

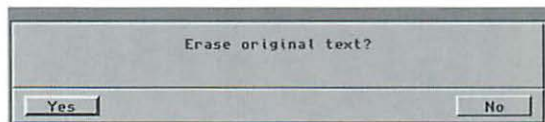
Lesson Three



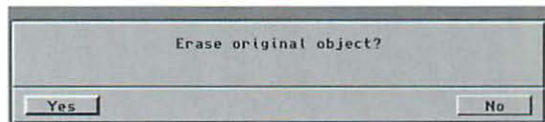
Select both the text object and the curve at the same time by *Shift* selecting the objects or drawing a marquee box. Choose the *Bind Text to Path...* command from the *Text* menu. This will open a requester to choose a text formatting option.



Click on the *Space to Fit* radio button gadget. This will distribute the characters along the curve without changing their size. Click on the *OK* gadget to close the requester. Another requester will open to ask you whether you want to erase the original text object. Click on the *Yes* gadget because it is no longer required.

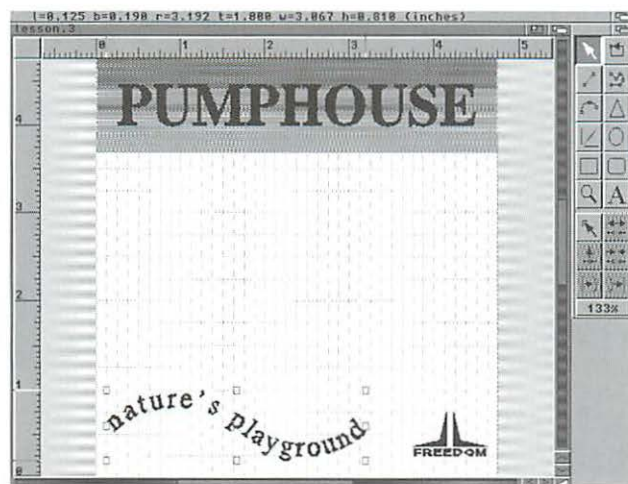


Another requester will open to ask you whether you want to erase the original object (curved path). Click on the *Yes* gadget because it is no longer required.



Art Expression will draw the text aligned to the curved path. The text object will be converted to graphic objects by this process, so you should immediately select the *Group* command from the *Object* menu to make the characters into one object.

Move the group to left:0.125", top:1.0" as shown in the completed illustration on page 58.



Adding the Background



You can add the background now. Select the *Box* tool from the toolbox and draw a small box of any size. Select the *Object* tool and resize the box by dragging its size handles.

Drag the top left size handle so that the box's coordinates are: left: 0", top: 3.75". Then drag the bottom right size handle so that the box's coordinates are: bottom: 0.0", right: 4.75". The box is now the correct size but must be filled.

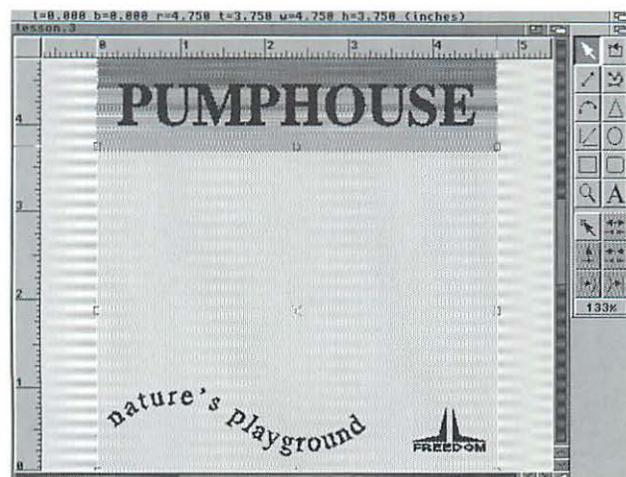
Lesson Three



Choose the *Line/Fill...* command from the *Object* menu. Change the fill color to Magenta. Click on the radio button for a percentage fill and enter "20" into the % text gadget. Press the *Return* key after typing "20" to see the sample fill color change to this amount. Change the line style to *None* by clicking on its radio button gadget.



The box must be moved behind the other objects in the illustration window. Choose the *Send to Back* command from the *Object* menu to move the box behind the other objects.



Placing Graphics

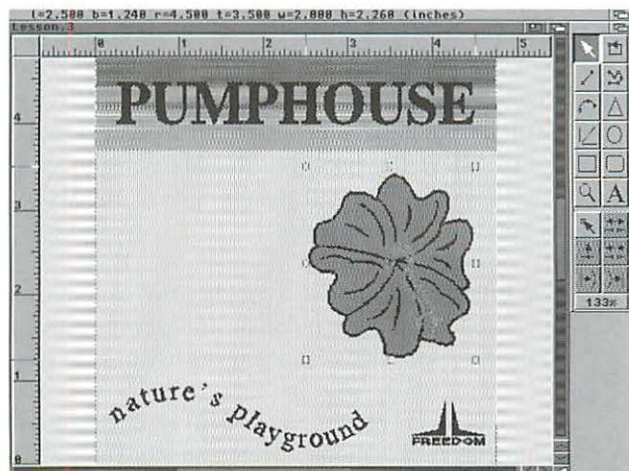
The only remaining tasks are to place the drawing of the hummingbird into the illustration along with a drawing of a flower. The flower is provided for you.

Art Expression can import graphics from a variety of formats. The hummingbird you traced is stored in IFF DR2D, the Amiga structured drawing standard. The flower is stored in Art Expression Encapsulated PostScript format. Drawings can be placed into an illustration and then treated as if they had been created in Art Expression.



Choose the *Place...* command from the *Project* menu. A file requester will appear to choose a file to place. Select the *Flower.DR2D* file in the *AEart* drawer.

After you click on the *OK* gadget in the file requester, Art Expression will load the illustration into the paste buffer. The mouseform will change to a picture frame shape. Position the top left corner of the picture frame at approximately *x:2.5"*, *y:3.5"*. Press and hold the left mouse button. Drag the mouse down to the right to define the size at which to place the flower. Hold down a *Shift* key to constrain the paste to the flower's original aspect ratio. When the width and height of the paste box is *w:2.0"*, *h:2.25"*, release the mouse button to draw the flower at the set size.

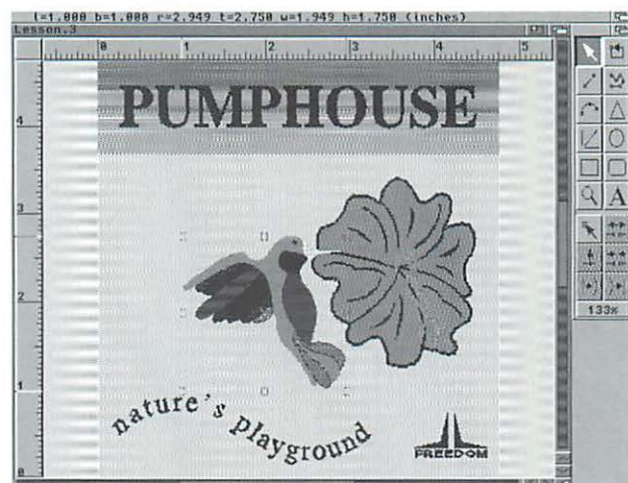


Lesson Three



Choose the *Place...* command again to place the hummingbird into the illustration. Select the *Hummingbird.DR2D* file you created from the file selector and click on the *OK* gadget. Paste the hummingbird starting at x:1.0", y:2.75". Drag paste it to w:2.0", h:1.75" while holding down a *Shift* key.

Traces are created ungrouped, so select the *Group* command immediately after placing the hummingbird to make it one object.

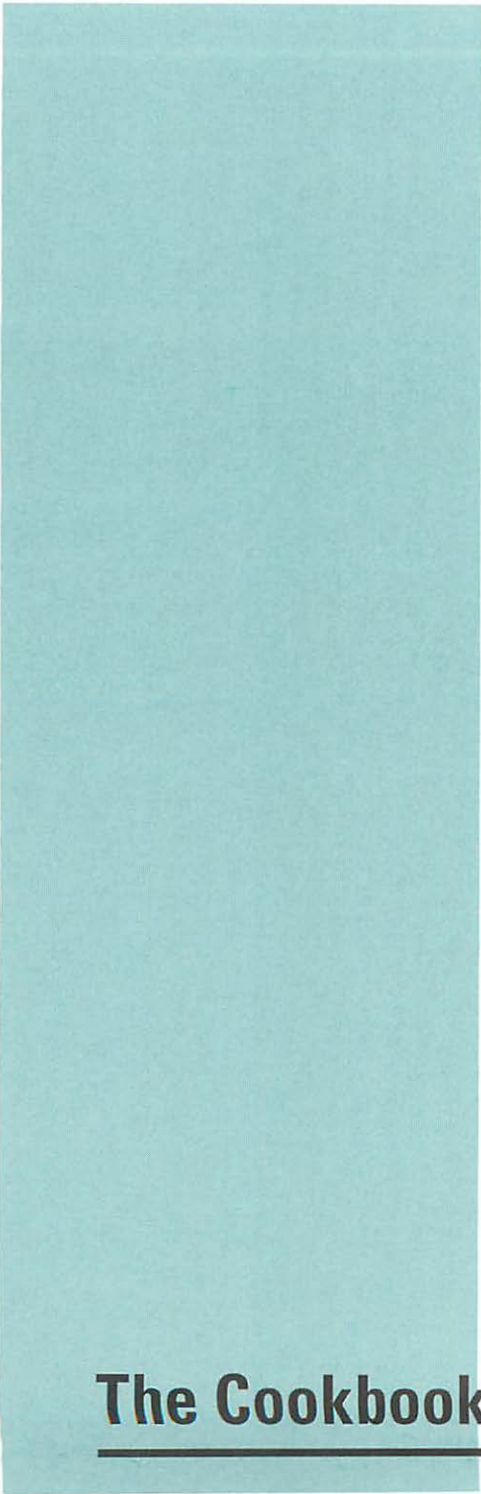


Congratulations! You have completed the third tutorial. Save your work now and print out your illustration. If you have a color printer be sure to print this in color.

The learning process for Art Expression does not end here. There are many Art Expression features which are not taught in this volume. If you learned the lessons in this book you should be able to apply them to Art Expression's other features. You will soon be able to use Art Expression's tools as easily as you can ink and paper.

The following section is a cookbook of examples which you can use to learn advanced techniques. It demonstrates some ideas which could not be covered in these lessons but which you can use in your own illustrations.

There are many other good sources of information for illustration techniques. Inquire at your computer dealer, art store or newstand for desktop publishing and graphic magazines such as *Publish*, *HOW* and *EC&I*.



The Cookbook



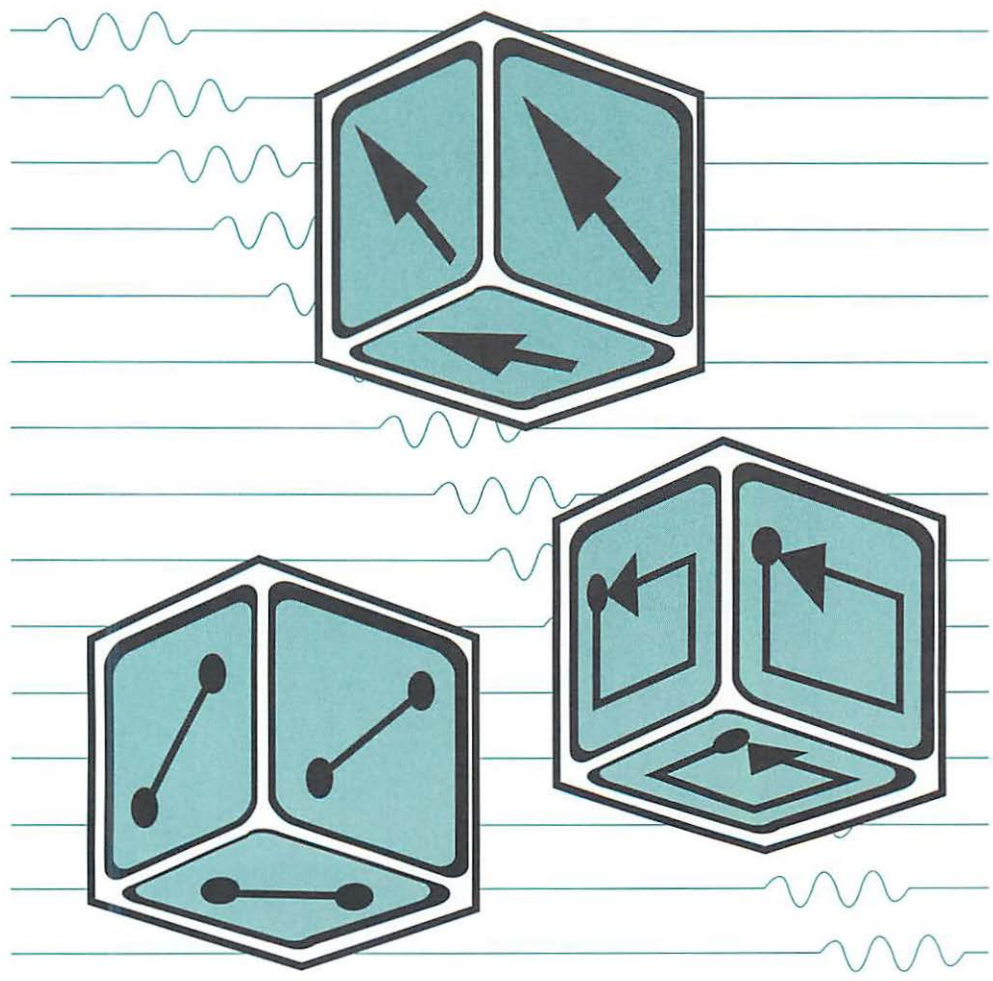
The Cookbook: Recipes for Success

Using the Cookbook

The Art Expression Cookbook consists of tips and techniques to help you create illustrations with Art Expression.

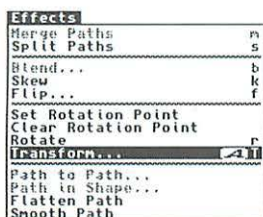
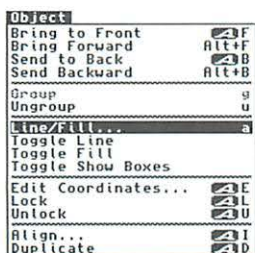
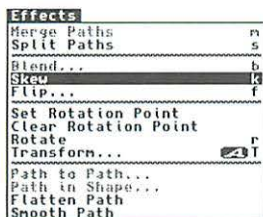
The format of the Cookbook includes a *recipe* for a number of drawings. The final version of an illustration is shown, and brief instructions are given to produce it. Unlike the tutorials which show you how to create a project step-by-step, the Cookbook's recipes assume that you know how to use Art Expression's features.

With Art Expression, you can create virtually anything you can imagine. The Cookbook shows you how some ideas are transformed into reality. We encourage you to send us your best work for the Art Expression Design Contest so that we can expand and improve future Cookbooks.



Blocks

Bruce Brachman



Draw the three visible faces of one block using the *Draw* tool. Draw the faces as one object, or merge them if drawn separately.



Select the *Edit Points* tool. Align the point handles with the “b” option.



Draw a rounded rectangle with the *Rounded Box* tool.

Skew the rectangle with the *Skew* command to make the recessed area inside each block face.

Fill the recessed area with Black using the *Line/Fill...* command.

Duplicate it at a smaller size using the *Transform...* command and fill the copy with a lighter shade to make the recessed surface.

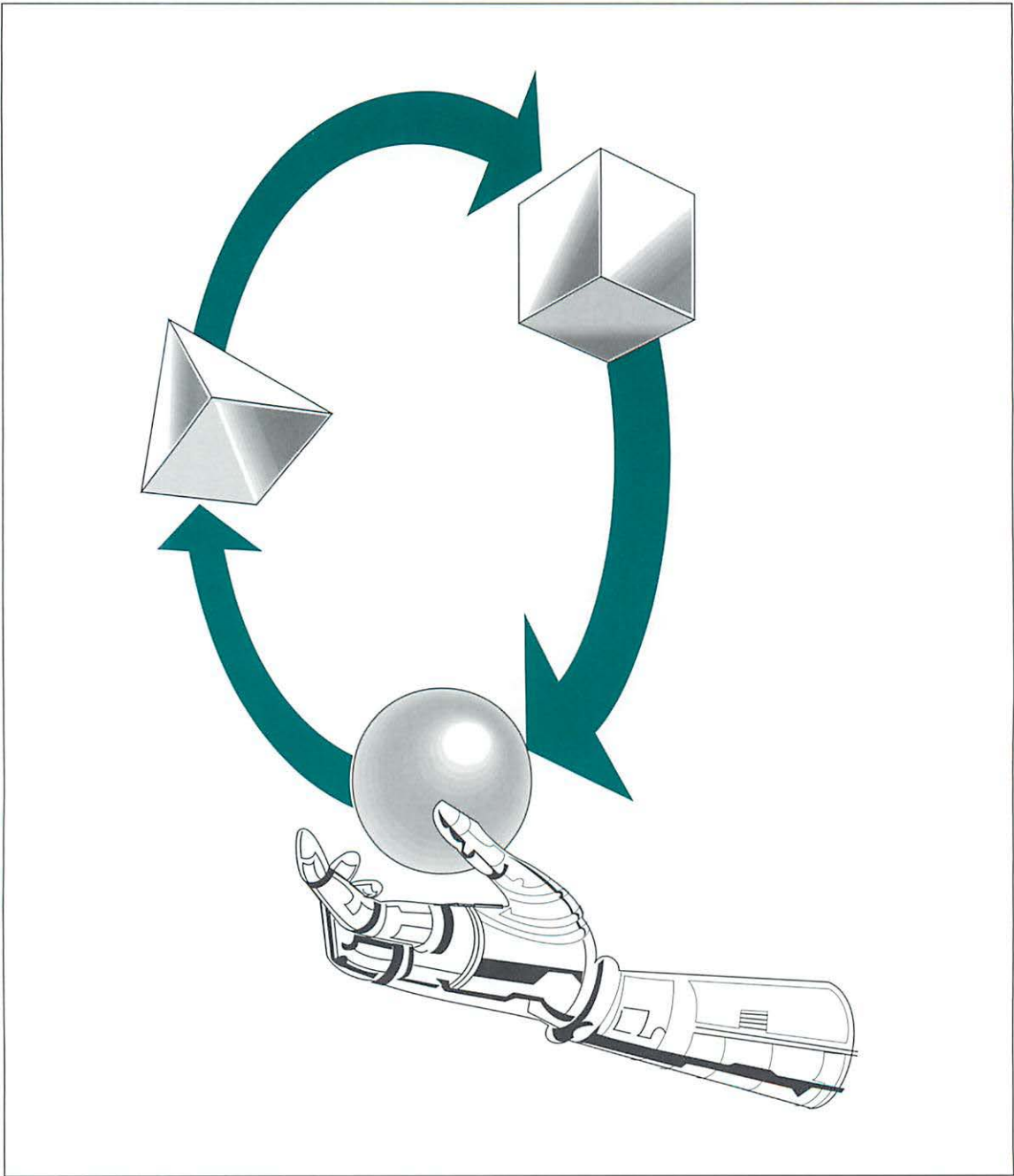
Finish the first block and make two more copies. Draw the icons for each face separately.



Draw the background with the *Draw* tool. Make one sine wave and then use the *Transform...* command to duplicate it with horizontal and vertical offsets.

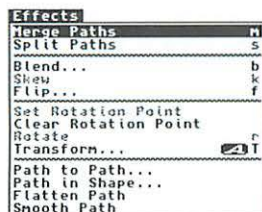
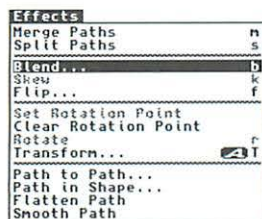
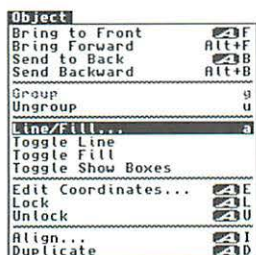


Extend the background lines to the correct length with the *Edit Points* tool.



Robot Arm

Bruce Brachman



Draw the robot arm using the *Draw* tool. Create as many objects as required with line and curve segments. Choose the *Object* tool after creating each object and press the *Space Bar* to deselect the object before reselecting the *Draw* tool to start the next object.



Fill the required parts of the arm and make the required lines thicker with the *Line/Fill...* command.



Draw the sphere with the *Ellipse* tool while holding down a *Shift* key to constrain it to a circle. Fill it 10% Black with the *Line/Fill...* command. Draw a smaller circle and make it solid White.

Select both circles and turn off their line styles with the *Toggle Line* command.

Blend the two together with the *Blend...* command. Make 15 steps and do not change the start and end objects.

Toggle the line style for the outer circle back on.



Draw the other shapes with the *Draw* tool. Shade the corners in the same manner by drawing two objects of differing shades and blending them together.

Draw two ellipses for the arrows. Merge them together with the *Merge Paths* command.



Choose the *Edit Points* tool.



Add additional path points at the appropriate places and cut each sub-path into three subpaths with the *Split Points* tool.

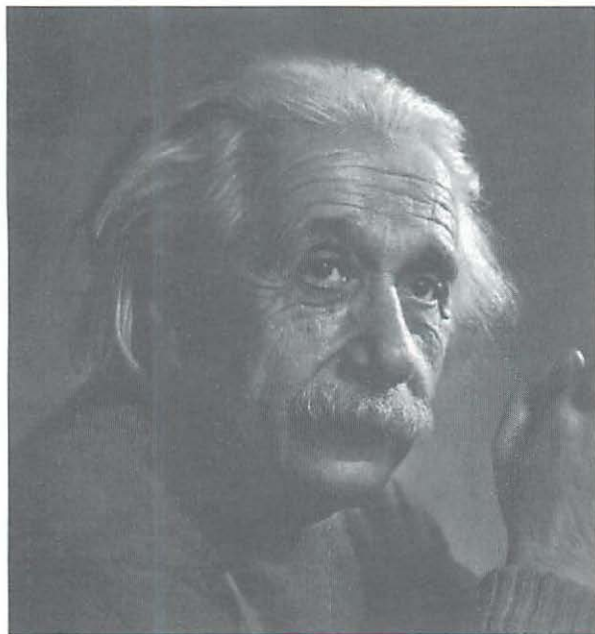


Draw arrow heads with the *Draw* tool and merge them together with the composite elliptical object.

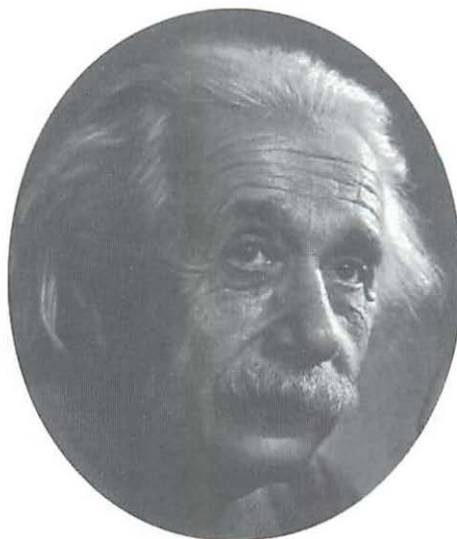


Edit the paths with the *Edit Points* and join the appropriate points with the *Join Points* tools to finish the arrows.





Original picture

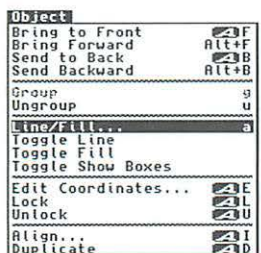
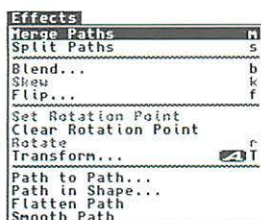


Picture masked by composite object

Cropping Pictures

Using Composite Masks to "Crop" Pictures

Desktop publishing users often need to crop bitmap pictures in shapes other than their natural rectangles. With Art Expression, you can create a white mask with a hole in the center through which the picture will show.



Draw an ellipse of the appropriate size with the *Ellipse* tool. This will be the hole in the mask.



Draw a rectangle with the *Box* tool large enough to cover the entire bitmap picture.



Select both objects with the *Object* tool. Choose the *Merge Paths* command.

Choose the *Line/Fill...* command. Change the line style to *None*, the *Fill Style* to *Solid*, and the *Fill Color* to *White*.

Export the object as an IFF DR2D drawing with the *Export...* command.

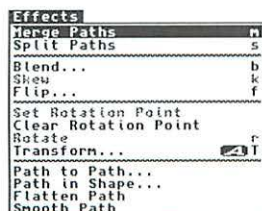
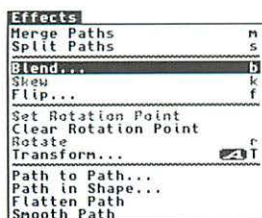
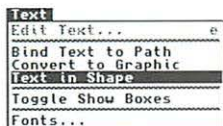
Import the object into an IFF DR2D compatible desktop publisher such as PageStream. Import the bitmap picture. Place the bitmap picture behind the object.

If required, drag the mask to the appropriate size and aspect ratio to show only the desired portion of the bitmap picture.

SUPER

Blended Text

Using Composite Masks to "Gradient Fill" Text



You can easily create the illusion of gradient filled text with Art Expression.



Place the desired text with the *Text* tool. One text object is used in this example.



Draw a shape with the *Draw* tool in which to warp the text.



Select the text object and shape with the *Object* tool. Choose the *Text in Shape...* command and warp the text vertically.



Draw a vertical box 0.05" wide and higher than the text with the *Box* tool. Place it to the left of the text. Copy and paste it to the right side of the text and in the center of the text.

Make the left and right boxes a dark shade with the *Line/Fill...* command. Make the center box a light shade. Toggle off the line styles of all three boxes.

Blend the left box to the center box with the *Blend...* command then blend the center box to the right box.

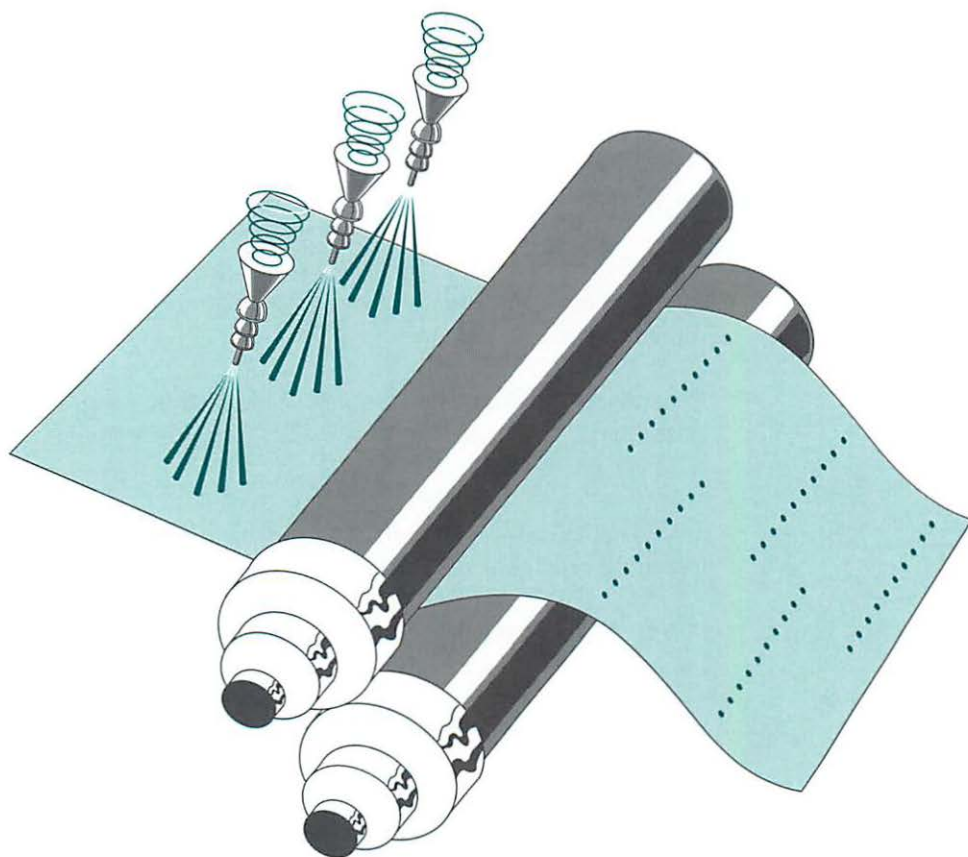
Group the blended objects into one object with the *Group* command and send it to the back of the stack with the *Send to Back* command.



Draw a box larger than the blend with the *Box* tool.

Select it and the text (which was converted to graphics by the *Text in Shape...* command). Merge them together with the *Merge Paths* command.

Change the merged object to solid white with no line style with the *Line/Fill...* command. The blend will show through the text shaped holes in the merged object.



Printing Press

Bruce Brachman

Object		
Bring to Front	⌘F	
Bring Forward	⌘+F	
Send to Back	⌘B	
Send Backward	⌘+B	
Group	g	
Ungroup	u	
Line/Fill...	a	
Toggle Line		
Toggle Fill		
Toggle Show Boxes		
Edit Coordinates...	⌘E	
Lock	⌘L	
Unlock	⌘U	
Align...	⌘I	
Duplicate	⌘D	

Object		
Bring to Front	⌘F	
Bring Forward	⌘+F	
Send to Back	⌘B	
Send Backward	⌘+B	
Group	g	
Ungroup	u	
Line/Fill...	a	
Toggle Line		
Toggle Fill		
Toggle Show Boxes		
Edit Coordinates...	⌘E	
Lock	⌘L	
Unlock	⌘U	
Align...	⌘I	
Duplicate	⌘D	

Object		
Bring to Front	⌘F	
Bring Forward	⌘+F	
Send to Back	⌘B	
Send Backward	⌘+B	
Group	g	
Ungroup	u	
Line/Fill...	a	
Toggle Line		
Toggle Fill		
Toggle Show Boxes		
Edit Coordinates...	⌘E	
Lock	⌘L	
Unlock	⌘U	
Align...	⌘I	
Duplicate	⌘D	

Object		
Bring to Front	⌘F	
Bring Forward	⌘+F	
Send to Back	⌘B	
Send Backward	⌘+B	
Group	g	
Ungroup	u	
Line/Fill...	a	
Toggle Line		
Toggle Fill		
Toggle Show Boxes		
Edit Coordinates...	⌘E	
Lock	⌘L	
Unlock	⌘U	
Align...	⌘I	
Duplicate	⌘D	



Draw two circles with the *Ellipse* tool for the near roller end cap.

Group and duplicate the circles with the *Group* and *Duplicate* commands. Resize the copy smaller to make the middle of the near end cap. Repeat to make the small part of the near end cap.

Use the *Line/Fill...* command to fill the end caps solid white and the final end cap solid black.



Draw a circle with the *Ellipse* tool for the far roller end cap.



Draw an object with the *Draw* tool from the near end cap to the far end cap to make the rollers. Make these a closed path and fill with a light black percentage.



Draw the highlight portions of the rollers with the *Draw* tool and fill with white and black.



Group the entire roller. Duplicate it and position the copy above and to the left of the original.

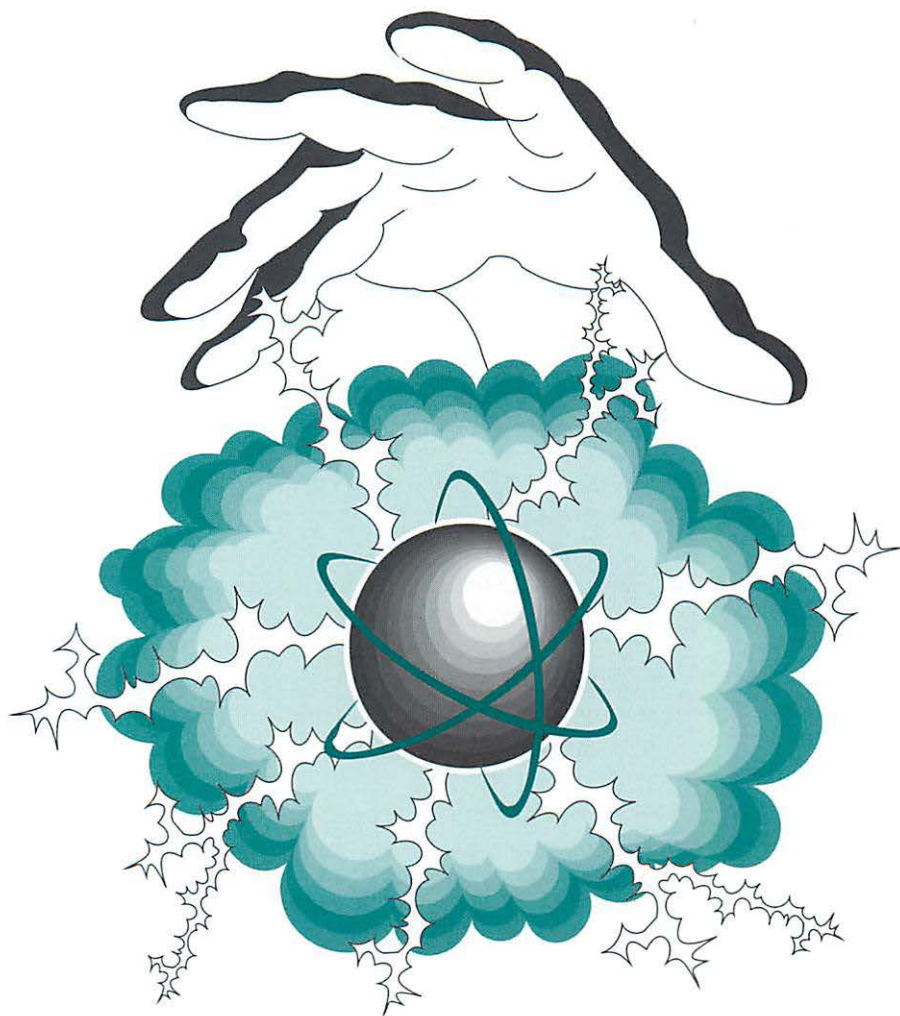


Draw the paper with the *Draw* tool. Fill it a light color with the *Line/Fill...* tool. Bring the top roller above it with the *Bring to Front* command.



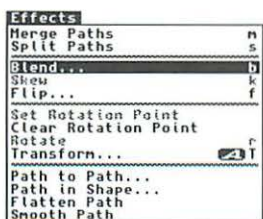
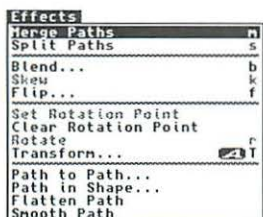
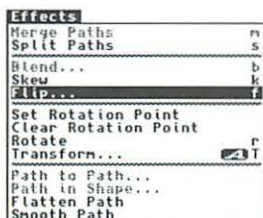
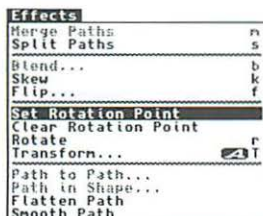
Draw cones with the *Draw* tool to make the ink sprayers. Fill with the *Line/Fill...* command. Group the objects and duplicate them as required.

Draw circles with the *Ellipse* tool to make the rings above them. Duplicate them smaller to make the required copies.



Hand and Power

Bruce Brachman



Freehand draw the hand with the *Freehand* and/or *Draw* tool. Create open paths and closed paths as required. Fill the necessary paths solid black with the *Line/Fill...* command.



Draw the top left quarter of the cloud with the *Arc* tool.

Move the rotation point to the bottom right corner of the cloud quarter's bounding box with the *Set Rotation Point* command.

Duplicate the cloud object horizontally with the *Flip* command using the *Copy and Flip* toggle. Duplicate both of these vertically with the *Flip* command.



Merge the four cloud objects with the *Merge Paths* commands. Choose the *Edit Points* tool. Join the end points with the *Join Points* tool.



Fill the cloud a dark shade. Duplicate the cloud and reduce the copy's size. Fill the copy with the light shade.

Blend the two clouds together with the *Blend...* command.



Draw a circle with the *Ellipse* tool for the sphere. Fill it with a dark shade. Duplicate it and reduce the copy's size. Fill the copy with a light shade.

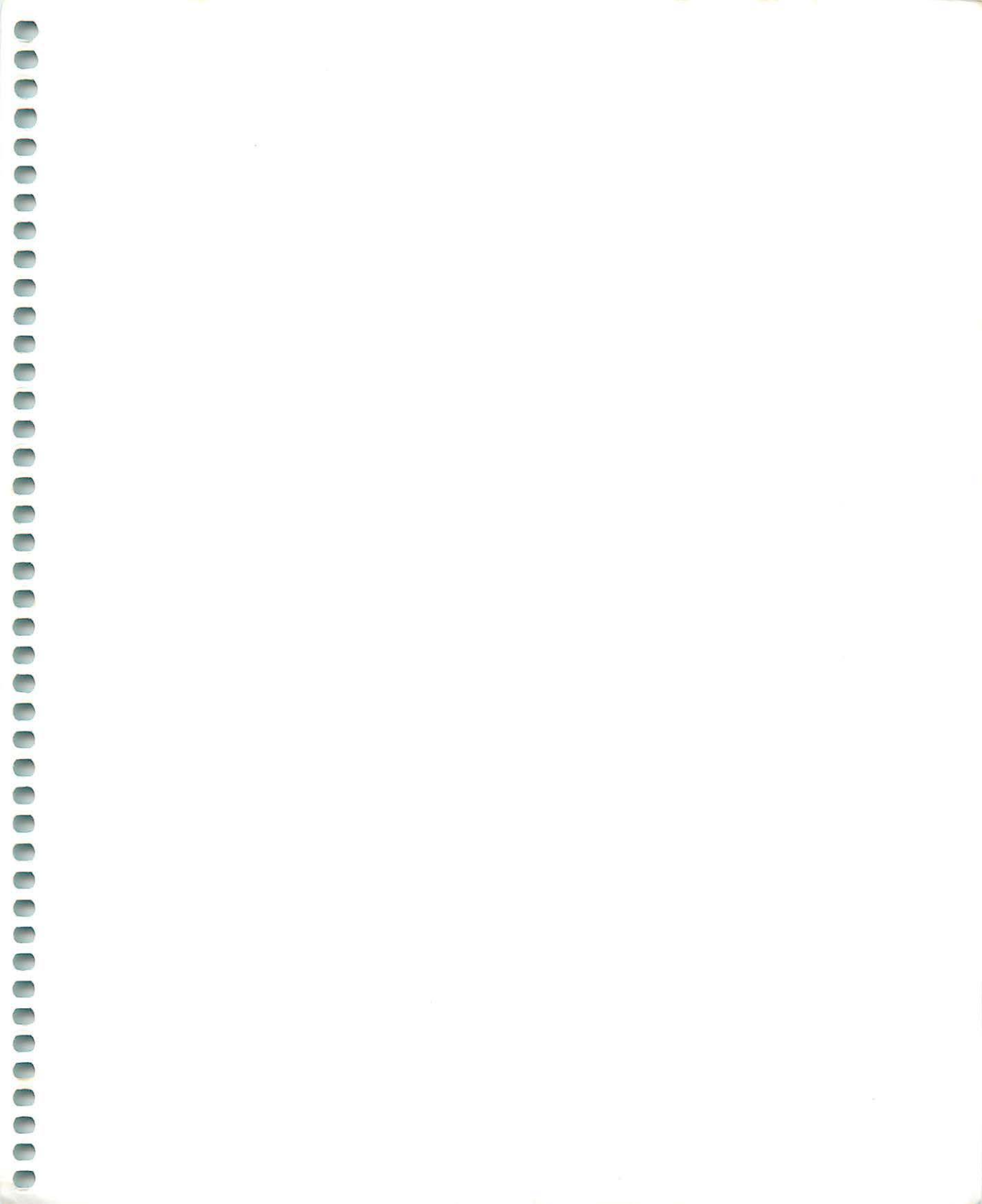
Blend the two circles together with the *Blend...* command.



Draw the lightning with the *Draw* and *Arc* tools. Fill them solid white.







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